DOXIADIS ASSOCIATES
Consulting Engineers
10 Venizelou Street
ATHENS GREECE
Tel: 28857 - 31604
Cables: DOXASSOC

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CLASSIFICATION SYSTEM USED BY DOXIADIS ASSOCIATES

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B The Policies

C The Programs

D People, Development, and Ekistics**
- Geographic factors
- Social factors
- Industry
- Agriculture
- Transportation

E Houses

F Structures (exclusive of Houses)

G Community services
(Utilities and Social Services)

H Regions

I Major urban centers

J Market towns
- Medium-sized and small towns
- New towns

K Villages
- Rural land

L Farms

M Surveys
- Census data
- Topographical surveys

N Research
(and Technical Education)

O Planning
(and Landscaping)

P Financing

Q Urban land

R Labor

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T Construction
(systems of building and costs)

U Implementation

V Management

W Administration

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HIB - GA 20, April 1957, vol. 3:20, Huxley, Julian.

World population, Scientific monthly, should read
Scientific American, March 1956.

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Arkhurst, Frederick S. Recent economic and social trends in the Gold Coast. Washington, The Institute of African-American Relations, 1955. 11p. (Africa lecture series no. 3.)

1. Mr. Arkhurst, who is an Information Office of the Department of Information Services of the Gold Coast, reviewed briefly recent economic and social events. He said that one of the things that strikes an observer is the tremendous desire for education among the people that almost approaches a fever. Free primary education was introduced in 1951 which immediately gave rise to the problem of providing a sufficient number of schools and teachers. Progress is being made in secondary schools, and programs of mass adult education are being developed with encouraging results. Illiteracy in the country is somewhat limiting the program of introducing new agricultural techniques and new marketing methods. Health facilities and good water supply is another problem that is being met on the local level with enthusiasm on the part of local councils.

2. The largest single development project is the $500,000,000 Volta River scheme, a miniature T.V.A., that involved the construction of a new port on the eastern seaboard, new railways, and a dam and hydroelectric generating plant on the lower Volta. The main purpose will be the exploitation of deposits of bauxite, estimated at 225,000,000 tons, in the area. There will be accompanying developments such as the distribution of electricity to the main centers of population as domestic and industrial power, and the creation of a vast navigable lake for irrigation and water supply. Fabricating articles from aluminum is another great project to use the resources of the country. The inclination is to encourage industries, other that extractive, which will teach the people new skills, rather than letting them remain producers of raw materials.

3. Community activities are being encouraged in rural areas. Spreading the idea of neighborhood cooperation is another project of the government. Voluntary self-help is beginning to appear as an element in villages and whole districts. Community centers are spring up, and with the help of mass education teams, many areas are learning to develop their communities, establish child nurseries, improve their agricultural methods, and form night schools. The next step will be research and study into local social and economic problem, developing training centers locally for welfare services and educational activities.

4. The transfer of authority to newly elected local councils has in some instances improved the efficiency of local units when they have realized the seriousness of their responsibilities. It is significant that Local Councils are working better in those areas formerly under the control of strong and efficient traditional authorities, as for instance in Ashanti.

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United Nations. Dept. of Public Information, in cooperation with the Technical Assistance Board. Technical assistance newsletter, no. 19. Burma. N.Y., May 15, 1956. 8pp.

1. The newsletter is a review of major development programs in Burma since 1952 which include industry, exploitation of resources, agriculture, education and health. Sugar factories, jute mills, steel and textile factories are all under construction. Oil fields are being rehabilitated and mines are being discovered or revived. Burma was one of the first countries to ask the U.N. to send a social welfare planning mission and her present program of social welfare is based on the report of that mission.

2. The cottage and small industries program, begun in 1951, has constituted the largest single contribution by the Expanded Programme to Burmese economic development. The project emphasized improvement of traditional methods and design, and the introduction of modern techniques in such industries as ceramics, silk weaving and textiles. Screen printing in textiles was one part of the industries program that taught local craftsmen to combine modern techniques with traditional art forms. A school was started, a cooperative formed, and training of workers undertaken by an expert who studied for eight months in the United Kingdom on an U.N. fellowship. Cottage industries improved sufficiently to be incorporated into the broad industrial development program of Burma. Additional experts were requested from the U.N., and their help was enlisted in putting production on a full commercial basis.

3. With the aid of the World Health Organisation, malaria was attacked by an international staff. Spraying was begun, and training workers in rural areas was undertaken on a broad national scale. The country was divided into seven control areas, and each area further subdivided so that every 100,000 people were covered by a separate team. As mosquito resistance to DDT increased after spraying, eradication rather than control became the primary objective. The country still lacks personnel, but like its tropical neighbors is still working actively to wipe out malaria before the mosquito-carriers gain a fresh foothold.

4. In 1948, when Burma gained its independence, there were a few hundred primary schools. Now there are over 1,000. High schools have increased from 40 to over 200. The expanding educational system required more teachers. A long-term plan for training has been adopted to meet this need. Rural teacher training is receiving particular attention in order to start schemes of community betterment, and to introduce improved methods of agriculture and to help the teachers to understand the local conditions of their country.

5. Catching and training wild elephants is the kind of work that involves considerable finance, group action and forest department facilities. It can not be done individually or by small groups profitably. Elephants are used also in logging operations until it was shown that machines are far more effective. The same mission that established the importance of machinery in timber extration investigated the forest resources. Although Burma had a well managed forestry program, full use of her woods has not yet been made, especially for building purposes. Bamboo is the cheapest material but of short duration. Other jungle woods, with the exception of the expensive teak, are not suited, in an untreated state, for building. One experiment was to treat hardwood with preservatives against termites and dampness, and the other was to manufacture chipboard. The latter proved durable, and with proper treatment, impervious to insects. Sample prefabricated houses were built of the chipboard, but commercial production had not been undertaken at the time of the newsletter. When it becomes readily available it should accomplish two purposes, both alleviate the housing shortage and should double or treble the revenue from Burmese forests.

6. One project concentrated on inventing statistical techniques suited to the country's particular occupations in order to prepare statistics needed for efficient labor administration. The statistical program included collection of data on the cost of living.

7. Housing and town planning is receiving due attention. A preliminary master plan for rebuilding Greater Rangoon was drawn up in 1956. The complete destruction by

fire of a town of about 20,000 inhabitants was a practical opportunity for rebuilding in new ways. Overcrowded conditions and inflammable materials make it impossible to stop a fire once started. The new plan for Rangoon incorporates green belts and open spaces as firebreaks. A National Housing Board, with a Town Planning Section has been established to deal with immediate problems of a pressing nature as well as to plan for long-range needs.

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Heeren, J. J., ed. The urbanisation of Djakarta. (In Ekonomi dan keuangan Indonesia, Economics and finance in Indonesia, Nov. 1955, vol. 8, pp. 696-713, with tables.)

Humid

The report is based on a research project undertaken at the request of Unesco. Conclusions are based on the results of a house-to-house survey made by the students at the Djakarta School of Economics. Substantial financial assistance was provided by the National Planning Bureau. After an historical account of the development of the region, the method of carrying out the survey is described and explanations given for choosing the sample districts. There has been no census in Indonesia since 1930, in that year the population of Djarkarta was 533,000.

The statistics collected and analyzed for the report indicates that the present composition of the population contains more than a third migrants who have arrived within the last four years. The greater number of migrants came as married adults with their families or relatives. Present occupations of males are largely laborers in industry and transport. The same group were formerly peasants, laborers in industry and unemployed. In following changes in occupation of 3610 migrants, only 41 per cent were still working in the same category after migration. Consequently, the remainder must have risen some distance in the social scale. This does not mean that conditions of living have suddenly become ideal, particularly for laborers in industry. As no data exists on the number of migrants who left the city because of unemployment, it is possible that the sample comprises only those who have been able to adapt themselves to city life.

The statistics seem to indicate that it is more difficult for women than for men to find a job in the city. After the second World War the number of unemployed shows a steady decline. The remarkable decline of domestic servants can be explained by the relative impoverishment of those groups that used to maintain a large staff of servants. On the other hand, the laborers in industry show a steady increase.

The data is striking on those who migrated because of the insecurity prevalent in some rural areas. It has long been the common assumption that a great deal of postwar migration was due to this phenomenon. The figures prove that this is not the case. Many thousands of refugees have left the unsecure areas, but these have mostly settled in the neighborhood of their former homes and not in the capital.

The summary of the report is reprinted in full:

"A summary of the result of our survey shows the following picture of the urbanisation of Djakarta.

"Almost all Asiatic countries have undergone a quickened process of dynamisation after the last war. One of the main aspects of this process has been the rapid growth of the cities. In Indonesia too more than a hundred thousand persons annually have moved to the capital. It is therefore not astonishing to see that three quarters of our interviews were born outside Djakarta. Their place of origin was for the greater part situated in West Java, especially in the area just south and west of the capital. These districts form a zone of transition or urban fringe. Another region which sent many migrants was Central Java.

"About half of the migrants have come in the last few years after the transfer of sovereignty in 1949. Between 1945 and 1949 a quarter arrived. The greater part moved directly, without transitory stages. More than half of the migrants were married men with their families, while the unmaried adults comprised about a third. Among women unmarried migrants were more numerous than among mem. Families were smaller for migrants than for native Djarkartanese. The relative family size was small.

"Urbanisation means social mobility, whether spatial (or horizontal) or occupational (vertical). By comparing former and present occupations, an impression was gained of the extent of these phenomena in Djarkarta. Among the new occupations labour in industry and transport predominated, while street selling came second. For the women domestic servants and labourers were equal. When the different occupations were grouped into a simple twofold social scale it was found that climbing up the social ladder was more frequent than falling. Proletarisation in the city was therefore less than expected.

9. "The causes of migration were difficult to establish, yet it was sufficiently clear that these causes were mainly of an economic nature. The insecurity of some districts was not a main cause of migration. Continuing one's own or one's children's study was also repeatedly mentioned.

10. "The distribution of the migrants over the kampongs of the city showed some remarkable features. People from the same ethnic or occupational group tended to flock together, thus forming special homogeneous areas differing in social standing. However, assimilation of the several ethnic groups is attained in relatively short time.

11. "The migration of the Chinese shows some special aspects. They have become more urbanised since the war, but lack of reliable data made it impossible to establish this concretely. It would seem that their occupational status has not changed much. Their family pattern still shows important differences with that of the Indonesians proper."

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551.5 (213)

* Lee, Douglas H. K. Climate and economic development in the tropics. N.Y., published for the Council on Foreign Relations, by Harper & Brothers, 1957. 182pp., maps, tables.

The Council authorized the study which led to the publication of this book. The author, an Australian by birth, has done extensive research in the tropics and is now working in the Quartermaster Corps of the U.S. Army. The book is a compilation of data on hot, wet climates, and tells also what is not known and remains to be learned to reach sound conclusions about the effect of tropical climates on economic development. The Table of Contents outlines the information contained in the volume, but the text contributes little to facts on building in the tropics already published in this Bulletin.

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United Nations. Economic and Social Council. Population Commission. Background facts on world population and population trends. N.Y., 1957. 56 pp., tables. (E Distr. General. E/CN.9/139, 21 February 1957.)

1. This document presents preliminary text of a chapter on population trends in various parts of the world to be included in the forthcoming Second Report on the World Social Situation. Vital statistics of most of the less developed countries are still defective in spite of recent improvements. Vital statistics are lacking particularly on the level of mortality. Comprehensive death registration systems are still completely absent or defective in operation. Birth registration is generally more satisfactory, but under-registration of births also is still an important problem in most Asian, African, and Latin American countries.

2. The present demographic situation in underdeveloped countries, where there is relatively constant high fertility and rapidly decreasing mortality, is leading to rates of population increase such as have never before occurred in the history of the human race. Increases of 3% per annum are not exceptional at present in underdeveloped countries, and most of their governments fail to recognize the social and economic implications of the phenomenon. The significant increase since 1951 is due, in general, to the coincidence of a considerable decline of mortality in almost all countries for which date are available or estimated, with fertility which has undergone relatively little change.

3. Estimated number of inhabitants per square kilometre for regions of the world in 1955 is given in the following table:

Region	Population in mid-1955 (millions)		Area (thousands of km.)		Population per Km.	
World	2,691		135,167		19.9	
Africa	223		30,284		7.4	
America	366		42,078		8.7	
Northern Am.		183		21,483		8.5
Middle & So. Am.		183		20,595		8.9
Asia	1,481		27,049		54.8	
Europe	409		4,928		83.0	
Oceania	15		8,557		1.8	
USSR	197		22,271		8.8	

4. (Area includes land area and inland waters, but excluding uninhabitated polar regions and some uninhabited islands.)

5. Further tables lead to the following statements on a world-wide basis, concerning population growth and age structure predicated on registered or estimated crude birth and death rates for various countries during 1950-55, together with corresponding rates of natural increase (excess of births over deaths per 1,000 population). The composition of the population by broad age groups is indicated by the latest census for each country.

6. Most of the countries can be classified into three groups:

A. Countries with high fertility and mortality: Probably much of Africa (except the population of European origin), much of Asia and some countries in Middle and South America. For these countries, the birth rates range from 40 to 50 and the death rates are in the neighborhood of 25 or 30 per 1,000 corresponding to an expectation of life of about 30 or 35 years. Population growth is moderate (1 - 2% per annum) and the population is young, having a large proportion of children and a low ratio of aged persons.

7. B. Countries with high fertility and moderate mortality: The major part of Middle and South America, some countries in Asia and possibly some in Africa.

Here the birth rates are of the same order as in Group A, but the death rates have fallen to the range of 10 to 20 per 1,000 or lower, corresponding to an expectation of life of 40-60 years. The result is rapid population increase, ranging from 2-3% per annum or higher. These countries also have many children and few aged persons in their population.

8. C. Countries with low fertility and mortality: Europe, the U.S., Australia and New Zealand, European population of South Africa, Japan, Argentina. These countries have birth rates in the range of about 15-25 and death rates in the neighborhood of 10 per 1,000. Their population is growing at slow or moderate rates (1/2 to 1 1/2% per annum). As a rule, these countries have an aging population with relatively small proportion of children and large proportions of persons over 60 years of age.

9. Age structure has important bearings on the productivity of countries, although no rule can be applied per se to all countries as there are vast differences between the working populations of advanced and less advanced countries. It is necessary to take into account the different customs as regards participation of men and women in economic activities at different ages. Males enter economic activity earlier and withdraw later in the under-developed than in the industrialized countries. Thus, the unfavorable economic effect of the age structure in the former countries is partly compensated. In the course of social and economic development and industrialization, the activity rates of the underdeveloped countries are likely to shift in the direction of those now observed in the industrialized countries, with longer schooling and later entrance of young people into economic activity, and with earlier retirement.

10. As mortality declines from its initial high level, so long as there is no great change in either fertility or economic activity rates, the ratio of workers in the population decreases somewhat. If there is then a shift of activity rates to the levels which are characteristic of industrialized countries, but still without any decline of fertility, the ratio of workers sinks to a low level, with a large increase in the burden of dependency, due mainly to the increasing proportion of young people attending school. In the case of inactive males from 5-25 in age, the main problem is to provide for their education. It may be assumed that the educational burden varies with the ratio of inactive males ages 5-24, per 1,000 male workers. This ratio serves as an index, not only of the needs for maintenance of schools, but also of the number of teachers required in proportion to the number of workers.

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Isard, Walter, and Robert E. Coughlin. Municipal costs and revenue resulting from community growth. (Journal of the American Institute of Planners, fall 1956, vol. 22:4, pp. 239-255, with tables.)

Part II, Industrial-residential communities.

1. In the first part of the report (reviewed in the Bulletin HIB - GA 14/15) the authors have presented cost and revenue estimates for hypothetical communities. The second part is concerned with similar problems in communities containing both industry and industry. The complete report is now available in book form. Again, communities with three different densities of residential development are investigated. The significance of variation in income level, level of community services, and the type and size of industrial development are examined. The summary is reprinted in full:

2. "The findings of this exploratory project suggest several conclusions. In communities which are primarily residential, tax rates are found to vary most because of differences in potential municipal revenues. Among communities, the income of residents as it affects property valuations is the basic factor which leads to the wide variation in potential revenues. Tax rates of communities, vary, too, because of differences in their levels of municipal costs. However, the variations that we find in municipal costs, though quite significant, do not lead to as great variation in required tax rates as do variations in potential revenues. The variations in municipal costs arise from differences in the level of municipal services provided, and to a lesser extent, from differences in density and patterns of development.

3. "The additional municipal revenues generated by a new industry are frequently considerably greater than the additional municipal costs. When they are, new industry, of course, tends to lower the tax rate. However, for an industrial district of any given size this tax advantage may vary widely depending on its industries' particular requirements for sewerage and other facilities, their property valuations, and the local purchases of their employees. Other things being equal, the larger the industrial developments, the greater the decrease in community taxes. However, when industrial development is accompanied by residential development, tax rates may either rise or fall depending upon the number of new residents and their incomes, the magnitude of the new industrial and commercial valuations, the levels of municipal services provided, the amount of unused capacity in the existing municipal structure, and other factors.

4. "Although we develop a comprehensive set of cost and revenue situations to reach these conclusions and although we present a set of Instructions by which these materials may be related to the financial problems of any given local situation, we caution the reader to use these conclusions and materials with considerable circumspection. Many of the materials are tenuous. Within the resources of this exploratory project the authors were not able to develop the materials on as reliable a basis as they would have desired, nor were they able to consider as many variables and their interrelations on as sophisticated a level as a more complete study would require. Hence, the reader should employ the materials as benchmarks only, and modify the procedures and conclusions of this report in the light of the specifics of his local situation."

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East African Town Planning Conference, Kampala, 1956. Papers. Entebbe, Uganda, Government Printer, 1956. 30pp., maps.

1. The problem of Africans in towns presents difficulty in Uganda and it was decided to introduce this subject at the first conference. As time was short only three papers were read. The first, by J. R. Hather, was Aspects of Redevelopment in Peri-Urban Areas. Peri-urban development in Uganda will have to be dealt with if the poorer sections of the community are to be integrated into the life of the town as a whole. In the area known as Kitoro, which contains a flourishing market and shopping zone and several villages, the plots are held on temporary occupation licenses, without surveying or demarcation. The area as a whole has never been planned and is without road, lighting, sanitation or adequate water supply. In one section, the occupants can subsist on the produce from their land. They also sub-let plots to tenants who have merely enough room on which to erect a house. The whole area is of concern on account of the high crime statistics. Attempts were made to improve building standards by demanding certain cheap forms of construction of three grades. Grade I is the existing standard for all permanent building. Grade II allows for semi-permanent building, mud and wattle walls and a roof of semi-permanent fireproof materials such as corrugated iron sheets, asbestos, cement sheeting or aluminium. Grade II allows low cost dwellings for lowest wage earners, permitting mud and wattle walls with thatch roof. The help of the Department of African Housing has been enlisted to clear and rebuild plots, after due compensation, and to provide two paved roads.

2. The second paper, The Problem of African Settlements on the Fringes of Towns in Uganda, by N. O. Oram, begins with the sentence: "Nowhere in Africa has the problem been solved of enabling the mass of Africans who live in urban areas to live in healthy and socially desirable conditions." He continues, "The most striking thing about Uganda is that its Africans do not know how to live in towns." Previous to the last war there was plenty of room for them to settle and to cultivate part of their food outside the towns. Attempts were made in regard to settlements in urban areas of Africa that failed for one reason or another. Estates in permanent materials for letting were not successful because it was not economic for estates to be build on a large scale without heavy subsidization. Neighborhood units of owner-occupied houses could not be provided for the majority of Africans who needed them because they could not afford to build at the required standards.

3. In spite of the fact that 25 of the 36 colonies, protectorates and protected states now possess comparatively comprehensive planning powers, few have exercised the full potential of their powers and there is little practical experience to draw from. There is a tendency to introduce new or amending legislation where there are town planning staffs, as in the Gold Coast, Uganda, Kenya and Tanganyika.

4. The neighborhood unit appears to be the final answer. This is an attempt to recover much that was worth while in the old village tradition and translate it into modern urban terms. It has to be acknowledged that an outside agency cannot create a community; it can plan and encourage the growth of a feeling of community by providing services such as schools, community centers, and shops. Urban authorities have had to set aside 2d and 3d grade housing areas where people could lease plots in a planned layout from government and build their own houses. The Ntinda experiment begun on Crown Land where there was freedom to experiment in housing standards and administrative organization, proves that well-built mud and wattle houses can be satisfactory where administrative control is maintained. The establishment of a school was important, too. And the experiment reveals how important it is to have officers with specialised knowledged in urban administration which includes health regulations, rating, estate management, ect.

5. Rather than clear land for redevelopment, it seems wiser to redevelop areas gradually. Driving away crime, prostitution and drunkenness from one community, as in Kisenyi, only forms a new plague spot elsewhere. Better material conditions do not improve moral health. Native enterprise must be given as free a rein as possible. Policies must be based on clear principles. First, they must provide

conditions acceptable to the Africans who are going to live in them. Second, they must be economic, both the country as a whole and the individual African must be able to afford them.

6. The third paper at the Conference by P. H. M. Stevens, discussed town and country planning legislation in the Colonies from observations made during a recent tour. His main impression was that the whole function of planning, was misunderstood on all govermental levels. In the planning process there are three elements, policy, planning, and development, equal forces exerted in three directions. Planning has been blamed for clearing large areas in African occupation without provision having been made for settlement. It would seem that this is a failure on the part of the planner. A serious defect is that there has been little attempt to grapple with the problem of the whole urban growth, and planning has been concentrated on high standard development of areas which have usually been between the boundaries of towns. Planning staffs are totally inadequate to the magnitude of the job facing them. The plea is that territories cannot afford large planning staffs, but territories cannot afford not to support adequate planning staffs as basic surveys and research are completely lacking and are fundamental if plans are to be reasonably based.

7. Workable legislation is the essential framework to successful planning. The history of colonial planning legislation extends over a short period of time, from the 1932 Act to the present spate of ordinances in the territories. There is great variety in the constitution of planning authority throughout African territories. An interesting and unique feature of the Nigerian Ordinances is that each scheme is required to provide for dealing with overspill created by the execution of a scheme.

8. The remainder of the paper discusses requirements of planning legislation under the following heads:

Planning authorities
Declaration of planning areas, preparation and approval of plans
Control of development
Positive powers to promote execution of the plan
Compensation
Betterment and other financial provisions.

9. The conclusion is that planning legislation in East Africa is by no means standing still, but is, by experiment and experience, moving towards formulae which are more sympathetic on the problems peculiar to particular local circumstances.

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Dey, Sushil. The village exchange, a programme for industrial extension in West Bengal. Calcutta, the author, 1955. 23p., illus.

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1. For six months prior to the compilation of the report West Bengal had been engaged in trying out a scheme for expanding production in rural industry. Authorities have agreed that revival of cottage and small-scale production is an essential condition of progress. At present the problem is to discover capital required for progressive increase in the efficiency of village production. The process of forming capital within the village, of generating new income, saving and investment out of existing rural resources, of stimulating the urge on the part of the villager to raise himself by his own efforts, are all problems that must be solved at the start. Extra articles made by the villagers were exchanged, with the wealth thus saved, new capital can be saved, new implements bought, new stock of raw material bought, and outside aid can be offered in the way of loans many times the amount of the villager's new income.

2. While loans will be used for output of products, the goods will still remain inferior in quality until workshops and training centers can be opened to improve the various types of hand work. As efficiency improves, specialization will proceed according to the location of raw materials and the experience of trades in one particular village. In its effect on the outside market, the village trade will change gradually from consumer to producer goods. Also, each village will tend to narrow its range of industries and to import from the market other kinds of goods made in other villages.

3. Workers, in going from village to village, have had to revive in many cases decadent crafts, or arts that have sunk to a low level through disuse. Workers then talk to the villagers, win their confidence, and make them realize the profit in rural enterprise. There is overall planning to be certain that production does not exceed local capacity for absorption and to push expansion in several lines of enterprise simultaneously, and loans are made in individual cases. The report concludes with the information that the program has contributed to raising the aspiration level of the people and providing them with an understandable technique to raise their standard of living. There seems to have been a slow rise in the total value of goods exchanged. And the general educational value of the program appears to have been effective in building a foundation for cooperative activity in industrial and other spheres of community development.

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United Nations. Econimic and Social Council. Statistical Commission. General conclusions concerning statistical aspects of international definition and measurement of levels of living (memorandum prepared by the Secretary-General). N.Y., 1956. 19pp. (Distr. General. E/CN.3/214, 2 February 1956.)

1. The concept of "level of living" is so wide that no single index has yet been devised to measure all the differences in all respects between countries. Elements involved in the general pattern of living are so numerous that an encyclopedic survey would have to precede analysis of statistics presented. Uniform standards, for example in food values, in the normal working age for a particular group of people, etc., are lacking, and there would be wide variation in standards between advanced and undeveloped countries so that elaborate statistical methods would have to be devised for world use. Indicators of universal significance and application need further study before statistics can provide any practical or useful interpretations. Countries are not agreed on the importance of collecting data of international value when they are still lacking data to promote the understanding of their own problems and enabling them to develop practical programs. While the U.N. has published regularly statistical information, this is applicable to nations rather than to sub-groups. Assessment of values need to be analyzed in terms of economic and social framework, background material that is not available for all countries or within the means of the U.N. to collect at the present time.

2. The comments of governments have been summarized in U.N. document E/CN/3/213, 20 January 1956. And from the discussions which have taken place the conclusion is that household inquiries into patterns and levels of living are desirable for the purpose of obtaining direct and comprehensive information on actual living conditions. There is a general consensus that the study of definitions and techniques required for the measurement of under-employment and irregular employment deserves higher priority among the statistical activities of the U.N. and the specialized agencies.

HIB - GA : 21

Meyerson, Martin. Accepted city planning theses. (Journal of the American Institute of Planners, winter 1957, vol. 23, pp. 35-41.)

p. 218
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1. A selection of thesis abstracts are presented as submitted by the institutions themselves (or in somewhat condensed form).

2. Anderson Max. The Urban Economic Base Study: An Examination of Its Nature and Usefulness in City Planning. M.C.P., University of California, 1956.
A review of city planning practice to ascertain what kinds of economic data are pertinent. Methods of identifying and measuring the importance of various kinds of economic activity and for understanding dynamics of economic activity in an area are discussed. Factors determining future economic growth, stability or decline are identified, and a program for improving the economic base is presented.

3. Barriere, Mario M. Comprehensive Planning for El Salvador. M.C.P., University of California, 1956.
A survey of development problems and policies in El Salvador, with general recommendations for a three-level system of national, "area", and city planning. Historical background is provided, and El Salvador's experience with substantive programs for economic and social betterment in various specialized fields is summarized. A chapter on pertinent experience in Puerto Rico is included.

4. Bolan, Richard S. The Journey to Work in Recently Suburbanized Industry. M.C.P., Massachusetts Institute of Technology, 1956.
Detailed analysis of movements of residence, changes in commuting habits, or changes in jobs on the part of employees of four manufacturing plants which moved from central to peripheral locations in the Boston Metropolitan Area. Findings seem to indicate that when the industries moved: there was significant change in job only on the part of secondary-workers (not the principal breadwinners in the family); there was relatively little change of residence even when the commuting problem became more complex and more expensive; that there was only slight tendency for those who moved to lessen the commuting time and cost.

5. The sample was too small to afford any conclusive evidence. The techniques developed may be well worth testing by application in other areas; and constitute a strong base for evolving an improved methodology for this type of study.

6. Clark, Robert Allen. A Survey of the Problems of the Rural-Urban Fringe. M.C.P., Georgia Institute of Technology, 1956.
The primary purpose of this thesis is to make the rural-urban fringe understandable to the planner so that the planner can formulate policies for action concerning the fringe. To accomplish this purpose, it was deemed necessary: (a) to analyze the development of, and reasons for, the growth of the rural-urban fringe as to the area of new metropolitan growth; (b) to present and analyze the definitions and delineations of the fringe and its subdivisions: the urban, intermediate, and extended fringes; (c) to refine the definitions of the subdivisions of the fringe by describing their physical and social characteristics; (d) to present and analyze the physical and social problems of the fringe from the viewpoints of the rural interests, the fringe dweller, and the central city; (e) to investigate the place of governmental reorganization in metropolitan areas as a solution to fringe problems; and (f) to suggest a role for planning in solving fringe problems.

7. Issues of particular interest to planners that are discussed include: (a) the uniqueness of fringe land use and social patterns; (b) the reasons for fringe location, such as dissatisfaction with city life, to discover the desires of fringe dwellers which can be translated into planning policies; (c) the role of planners in alleviating social conflict in the fringe; (d) the origin of fringe problems in the lack of planning control and governmental disorganization in metropolitan areas; (e) the place of agriculture in plans for metropolitan development; and (f) zoning as a means of restricting the location of urban residence in rural areas.

8. Crozier, James Robert. Economic Base of Cities and Their Rate of Growth. M.R.P., University of North Carolina, 1956.
The economic base concept pictures the urban economy as composed of basic activity - production of goods and services for non-local consumers - and service activity - production of goods and services for local consumers.

9. This thesis tested the hypothesis that cities with greater amounts of basic activity grow faster than cities with lesser amounts of basic activity.

10. The procedure was as follows:
1. Cities from the same size range were selected and classified as manufacturing or diversified by their dominant employment pattern.

2. The amount of basic activity in each of the sample cities in 1940 was estimated and compared with the 1940-1950 rate of growth.

11. The test results revealed that the manufacturing cities did not conform to the hypothesis and that diversified cities conformed to the hypothesis but the correlation was weak.

12. It would appear from the test results that the basis-service ratio of a city is not, in itself, a reliable indication of the growth potential of the city.

13. Fenichel, Heinz. Sound as a Factor in Urban Aesthetics. M.C.P., University of Californai, 1955.
Following a brief survey of aesthetic and urban aesthetic theory, this study proposes that urban aesthetics, comprising all modes of perception, is an important environmental factor and that its influence can be investigated and analyzed empirically. A survey of sound in three different areas in Berkeley by questionnaire and tape-recorder is reported and conclusions drawn.

14. Hodgell, Murlin R. Rural Planning: Vol. 1: Evolution and Revolution in Rural Living; Vol. II: Architecture and Agriculture. M.R.P., Cornell University, 1956.
The first volume traces the development of agriculture, farm layout and rural architecture in the Western World. The second volume examines details of farm location and planning and the design of agricultural buildings. The author draws on his experience as former Assistant Professor of Agricultural Engineer Research at the University of Illinois in proposing a number of principles for farm building design. Numerous photographs and plans.

15. Hoppenfeld, Morton. The Provision of Community Facilities for a Rapidly Growing Small City. M.C.P., University of California, 1956.
An approach by which a city planner and department heads within a small city's government may plan ahead for public physical facilities. A discussion of space and locational requirements for a series of facilities and questions as to which facilities belong in a "civic center".

16. Ignacio, Rafael L. The Urban Planning Function in Puerto Rico. M.C.P., University of California, 1956.
A study of the evolution of island-wide and local government in relation to physical development problems. The study includes a critical analysis of the city planning role of the Puerto Rico Planning Board and presents suggestions for redefining the city planning functions of the Board.

17. Kent, Hollister. Vera Cruz: Brazil's New Federal Capital. Ph.D., Cornell University, 1956.
An account of the policies and procedures followed in selecting the site for the new Brazilian capital city in the interior of the country. The author was connected in a responsible capacity with the recent studies by an American group which led to the selection and acquisition of a site by the government in the State of Goyas. The use of interpretation of aerial photographs in the survey of a vast frontier area is described in detail. Some general suggestions for the design of the new city of 500,000 persons are discussed. Many maps and photographs.

18. Lawrence, Burtis Elwood. A Survey of Design Device Useful in the Modification of Existing Neighborhoods. M.R.P., University of North Carolina, 1954.

This study is a survey of design devices useful in the modifications of existing neighborhoods with considerations of the implications of such devices in furthering the objectives of neighborhood improvement according to Perry's unit neighborhood concept.

19. Mace, Ruth Lowens. Fiscal Aspects of Land Use Planning. M.R.P., University of North Carolina, 1956.

This thesis contains a survey and critical analysis of studies relating costs of providing municipal services to specific areas or categories of land use to revenues to be derived from these areas or land use categories. Research was designed to discover what studies have been made, and by whom; what methods were employed in the development of these studies; what conclusions and recommendations were arrived at; and what applications have been made of these research findings. In essence, the so-called "cost-revenue" study is examined, as a type of planning study, to determine its utility as a tool for the land use planner or for other purposes.

20. Rai, Pattathamoger Bhagwandas. Planning Consideration in Low-Cost Housing in Western Countries and Their Application to India. M.C.P., Georgia Institute of Technology, 1956.

The purpose of this thesis is to make discriminating application to India of Western planning considerations in lot-cost housing. Long term and immediate factors causing the grave housing crisis were reviewed in order to get a clear perspective of actual conditions of housing in India. Also, a study was made of the various housing programs and the measures undertaken to cope with the situation.

21. Rugg, William Russell. "An Investigation of Procedures and Techniques Applicable to the Design of Single-Family Residential Subdivisions." M.R.P., University of North Carolina, 1956.

An examination of present day techniques in subdivision design in an attempt to present a systematic and concise outline of those design and engineering procedures involved in the design of subdivision plats for single family residential areas.

22. Sanford, George A. "Techniques for Determining Desirable Residential Lot Sizes." M.C.P., Georgia Institute of Technology, 1956.

Growing communities face the problem of determining desirable residential lots to be specified in land-subdivision regulations. This thesis suggests a method for determining these desirable sizes.

23. The solution involves determining a desirable lot size that is based upon the space requirements of the activities normally conducted on such a lot, and on an analysis of the effects of topography, soils and soil characteristics, floor area requirements per family, foundation area requirements for dwelling structures, and the space required to achieve desirable standards of light, air, amenities, and sound insulation.

24. The effect of both the cost of raw land and the cost of providing public water, sewerage, streets, sidewalks, curbs and gutters to the lot are determined. The cost per lot of providing public schools and recreation facilities is found and added to the cost of services to the lot. A comparison of the total cost of the 13 most common lot sizes is made for lots prepared on raw land of varying costs per-acre.

25. Shiber, Saba George. Vol. I: Urban Formation and Reformation. Vol. II: A Descriptive and Critical Analysis. Ph.D., Cornell University, 1956.

An attempt to apply critical reasoning to the visual characteristics of urban formation. Includes a descriptive analysis of the "builders" of urban formation, and a critical analysis of the dynamic determinants of urban

formation. It is concluded that, given active urban universals, urban formation, and thus urban forms, may be broadly explained, predicted, and designed in direct proportion to the predictability of change, and the mode of incidence of the rational factor.

26. Volume II contains 650 illustrative sketches by the author and 24 photographs.

27. Sh bli, Khalid. Role of Urban Planning in a National Planning Agency for Pakistan. M.C.P., University of California, 1955.
A survey of urbanization trends and mounting urban problems in Pakistan, leading to proposals that would make urban planning an integral part of national and regional development policies. Background economic and cultural factors are considered. Conditions in Karachi, as well as representative smaller cities, are analyzed.

28. Skrivanek, Franklin Benjamin. "Techniques for Analyzing the Make-up and Vitality of the Urban Economy". M.R.P., University of North Carolina, 1954.
Many new techniques for analyzing the urban economy have been developed in recent years. Most of the new ones are not ready for use because the necessary data is not available. An evaluation of these techniques proves difficult for lack of a theoretical frame of reference. It is concluded that a theoretical model for urban economic studies should be developed to further urban research. Evalustion of techniques that analyze the urban economy will be more meaningful after a model is developed.

29. Sobhagya, Komarakul. A Study of the City of Bangkok, Thailand, and Recommendations for Redevelopment. M.R.P., Cornell University, 1956.
A general plan for the development and redevelopment of the Bangkik metropolitan area by a Thia citizen. Contains a description of the geographic setting of the city, its early growth and current problems. Solutions to major problems are proposed. Proposals are also made for the administration of planning in the area. Maps and plans.

30. Sunderland, Joan. Planning at the Provincial Level: The Ontario Experiment. M.C.P., University of California, 1956.
A description and analysis of the local and large-scale regional planning activities of the Ontaric Government, and a comparison of California and Ontario governmental organization for state planning.

31. Trimble, Otis Marion. "Trucks and Urban Congestion". M.C.P., Georgia Institute of Technology, 1956.
The purpose of this study is to determine the part played by trucks in the overall urban congestion problem, to analyze and evaluate the effectiveness of the measures employed to alleviate this congestion, and to make recommendations for a comprehensive program to alleviate traffic problems resulting from truck operations.

32. The results of this study revealed that the major deficiencies of most of the present congestion alleviation programs are the lack of a single agency in each city charged with the overall administration of the traffic program and the palliative rather than preventive nature of the majority of the measures utilized. Recommendations are made for the establishment of adequate programs of city planning and traffic engineering as the best method of achieving an effective and lasting solution to the truck traffic congestion problem.

33. Walters, Reginald Rea. 'Land-Subdivision Control with Emphasis on Location and Timing". M.C.P., Georgia Institute of Techniolgy, 1956.
The purpose of this thesis is to review and analyze subdivision control with emphasis upon location and timing and to recommend possible courses of action whereby the city may effectively regulate both location (where to subdivide) and timing (when to subdivide).

34. The thesis is concerned with six main areas of study: (1) a review of the needs for regulating location and timing of developments; (2) a discussion of the factors which will necessarily require study to establish standards controlling location and timing of subdivision activity; (3) an analysis of existing

state subdivision legislation; (4) the review of court decisions establishing the legality and determining the attitude of the courts on various related points of subdivision control; (5) a review and analysis of existing control measures affecting location and timing; and (6) a review of various means and methods proposed to control these factors.

35. The preparation of a "plan of expansion" as a guide is basic to any endeavor to control location and timing. These factors may be controlled by either a combination of subdivision and zoning, a coordinated utility expansion program, cooperation between the city and county, or by a combination of the above. With adequate new legislation, such a "plan of expansion" could be adopted as an ordinance by the city and administered by a central agency.

36. Werner, Robert James. Industrial Characteristics as They Affect Communities, An Evaluation and Classification. M.U.P., Michigan State University, 1956.
As industrial characteristics vary from industry to industry, propensity to contribute beneficially to a community varies from one industry to another. It is the intent and purpose of this study to evaluate a number of these industrial characteristics as they affect communities, and, further, to classify industries in terms of these characteristics and capacities to benefit communities.

37. For the purposes of this study, the following industrial characteristics were examined: reliance on supplementary industries; reliance on related industries; exonomic stability; seasonality of employment; composition of labor force employed; labor skills employed; personnel policies and wage rates; plant management and operation; size of establishment.

38. An evaluation was made to determine what possible effects each industrial characteristic might have on communities. In addition, industrial groups as determined by the United States Bureau of the Census were classified in tabular form by the capacity of each to provide benefits to communities in terms of the industrial characteristic.

Galepides, B. Building industry and building materials of Indonesia; Practical rules for designing in wet tropical climate, by B. Galepides, United Nations expert. Bandung, U. N. Technical Assistance Administration, 1954. 2 vols., illus., plans, diagrs., cross sections, tables. (TAA 173/71/02 Reports.)

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Digest prepared by Puspo-Harsono, M.I.T.

1. Building industry and building materials of Indonesia reviews the current trend and activities and examines the possibility of a reorganization. It is divided into three parts:

2. I. Who are in charge of building, and how they work.
   Designing: Private
   Official
   Contracting
   Execution of the work
   Control and responsibility

3. II. What is actually built in Indonesia and how it is built.
   The possibility of economy, by a better utilisation of available material and by correct adaptation of the design to the climate.
   How to realise these points.
   Adaptation of regulations.
   Rules for design in wet tropical climate.

4. III. The needs of Indonesia.
   The known fact.
   Estimation in dwelling unit.
   Estimation in materials.
   The gap -- how to fill it.

   Conclusion.
   A five year plan for the material.
   A five year plan for the building.

5. Part I is a resumé of the present situation of architects (private and official), contractors, and administrators. A chart presents diagrammatically the general organization and administrative channels for building by the Ministry of Public Works and Power. The report describes some of the building actually achieved, together with the large amount of subcontracting involved. The inefficiency of building methods is stressed along with seemingly unreasonable building regulations, and some means are suggested for possible improvement in the present situation.

6. Part II deals with the completed unit, regarded from the angle of building materials, technique, and architecture. With the existing regulations there is much waste of materials. Designs are still those of European conception not suited to a wet tropical climate. There is lack of consideration to Orientation, Ventilation: which requires high ceilings without adding to comfort.

7. Comparison of quantities of materials for a $50m^2$ house for a family of five persons between the houses actually being built and those drafted as a minimum type by the Department of People's Housing shows why the cost of building is higher than necessary and explains in part the shortage of materials. Three reasons for waste are given:

   1. Unfair use of material due to lack of confidence in local material (unfair is the word used throughout the report although unreasonable or unsuitable would be more apt).

2. Non utilization of techniques, which although well known and tested, are ignored in spite of the fact that the results would cost less.

3. Misconception of design due to lack of knowledge of climatic conditions, and to regulations or customs that do not permit better solutions.

8. Part 3 presents actual need of dwelling units in Indonesia as compared to population data and expected rates of growth in years to come.

9. "Practical rules for designing wet tropical climate" summarizes useful recommendations for the local architect and others involved in building in Indonesia. If applied, the recommendations will result in more comfortable housing, at lower cost and better designed than what is being constructed at present. Practical considerations, combined with traditional ways of building, present a new aspect of the problem that will result in a better and more personal style.

10. Physical comfort and comfort zone. A human body feels comfortable when:

1. It is not too hot nor too cold
2. When a normal physical effort requires just the necessary physical and nervous exertion
3. When the recovery from this effort is quick and easy
4. When the physiological functions operate smoothly.

11. The characteristics of the climate in Indonesia are:

1. Average temperature not very high (23 to 27°)
2. High rate of humidity almost all year
3. High rate of insulation
4. Small difference of temperature among day and night especially at sea level.

12. The designer must create, within the house, conditions as close as possible to the comfort zone. This should be done without more expense or disturbing the living of the people. Main points are:

A. Not aggravate the climatic conditions by having heat accumulate within the house
B. Help the evaporation of moisture on the skin by constant air flow
C. Help the eye accommodation by screening light
D. Help the rest by creating silent areas in the house and its surroundings.

13. In not increasing bad climate condition in the house, heat must not accumulate which normally comes from the roof and from the walls. The solution consists of:

1. Roof

A. The lighter the color of the roof, the less heat absorption.
B. Sweep the space under the roof with air flow.
C. Choose a simple roof design to prevent immobile air pockets.

2. Walls

A. Don't let sun reach the masonry
B. Don't let the sun reach inside the rooms.
C. Give the building N/S orientation; Keep E/W walls blind.

D. Put secondary rooms (bath, lavatory, circulation) against E/W sides
E. Open only N. and S. with protection of the minimum verandah.
F. Complete the shadow belt by screens of vegetation, by a screen of light material fixed to the wall having high reflection as the air flow along wall and screen will help dissipation of heat and the shadow will protect the masonry.
G. Use lightest possible material available in smallest quantity
H. Use paint in clear colors. Orange, red, brown, dark gray to be avoided
I. Use white, pale blue, pale green
J. If there is a group of buildings, arrange to shadow one another

14. The following points are important:

Movement of air is accelerated when it is pressed along surface of wall, ceiling and floor that makes a relatively long and narrow volume open at opposite ends.

15. Orientate buildings with two main walls in shadow all year with minimum verandah.

16. Combine ventilation of roof and room using ceiling as screen.

17. For factories only, there can be an opening in the roof at least 1/3 of the vertical height.

18. In the arrangement of rooms, there should be one room opening N/S with its verandah, circulation on the other side which does not stop ventilation.

19. A raised house is a good solution because the floor is also ventilated and usually there is always some breeze even during calm weather.

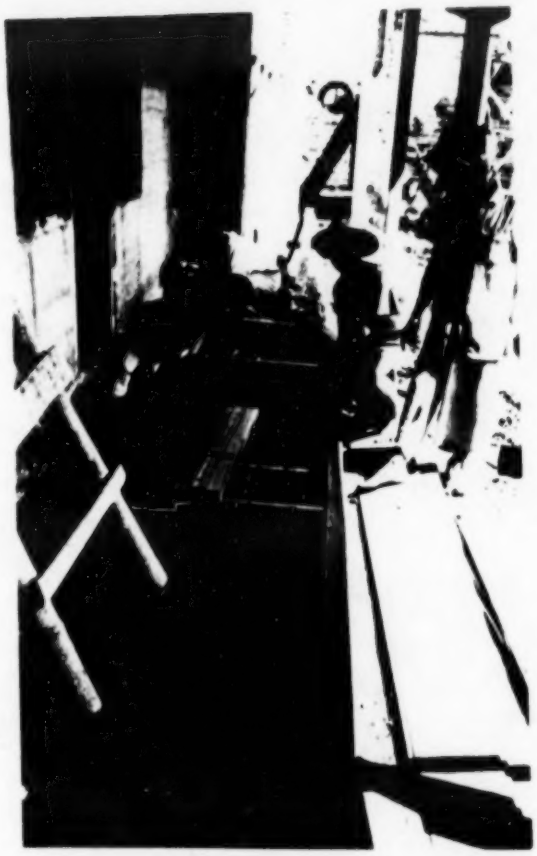
20. Leave the two opposite ends of the room open to air from floor to ceiling. Do not use glass windows; use only slatted shutters with an angle of 15 to 20° to the horizontal. Use partitions to conduct air flow to important spots. Pivoting screens are good.

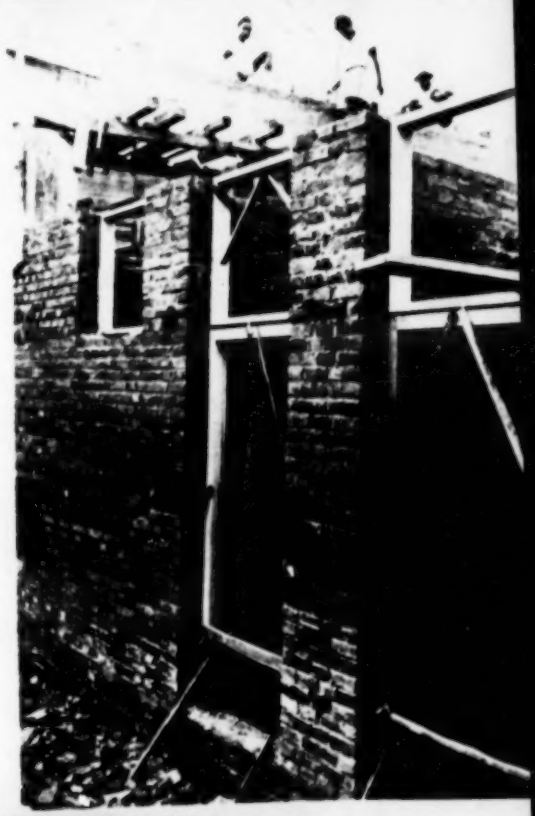
21. As luminosity is more harmful to people than heat, shutters should be near beds, slats can remain horizontal. There should be grass in front of the house. Floor and ceiling should have carefully chosen colors.

22. Rest is important to nerves in tropical climates, therefore bedrooms should be as far as possible from streets and neighbors, vegetation should serve as screens, light curtains are also useful as screens. The livingroom can be separated from the bedroom. Double partitions provide sound insulation and can be used as clothes closets.

On the same yard of a big contractor.

Right masonry work.
Below the wood-frame of the doors and window made on the spot.
When saw-mill work at 40% of their capacity.

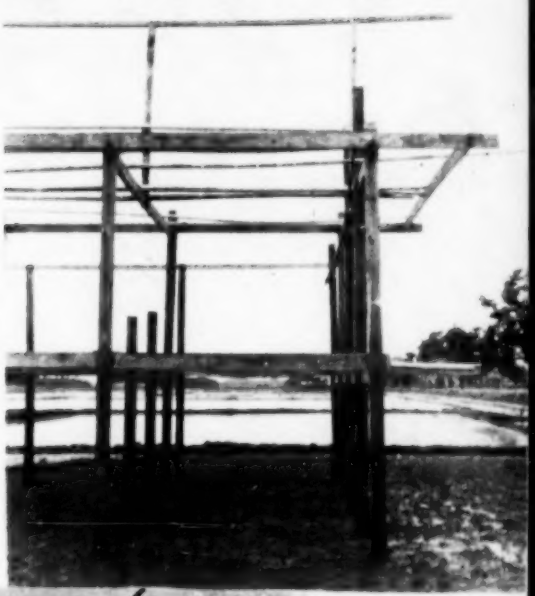




Right and below, thick door-frame used as lintel during construction. Remark the concrete poles for a 1 story building in the walls.

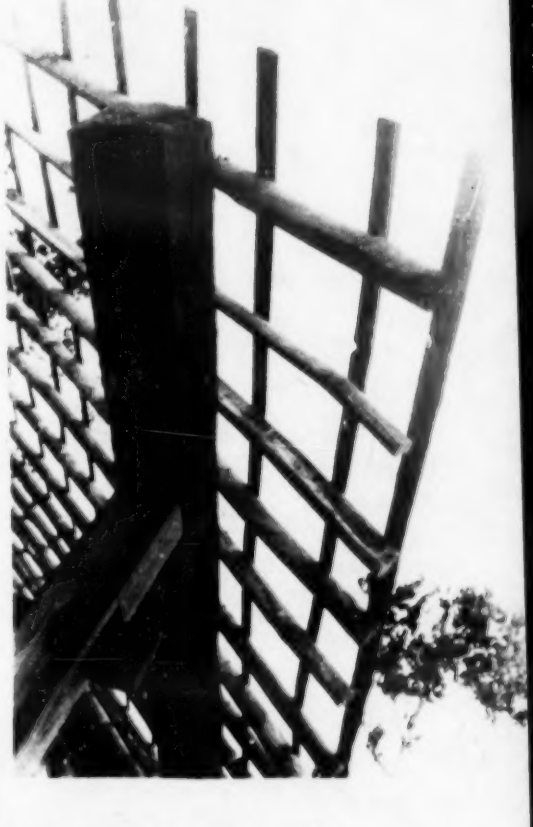
House frame in Sulawesi (Celebes).

A quite good frame work. All assembly with wood-rawls. Roofing with "atap". The main frame is combined with bamboo beamrand rafters to support the roof.



EAST - JAVA.

A very nice piece of frame-work, using split bamboo only for rafter and lath. Roof with people tile. Typical Javanese design.



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Galepides, B. Development of the building industry, prepared for the Government of Indonesia, by Galepides, appointed by the United Nations Technical Assistance Administration. N.Y., U.N. Technical Assistance Programme, 1956. 84pp. (TAA 173/71/023. Report No. TAA/INS/5.)

Digest prepared by Puspo-Harsono, M. I. T.

1. This report, which is a restricted document, is an account of the governmental aspects of the building industry in Indonesia.

2. Part I, Designing and contracting. Nearly all building is under the control of two ministries: Ministry of Public Works and Power through the Departments of Government Building, and Town and Country Planning, and the recently created Department of People's Housing, and the Ministry of Economic Affairs, in particular the Department of Industry. The Ministry of Public Works and Power is concerned with design, regulations, contracts, and control. The Ministry of Economic Affairs is concerned with production and the supply of building materials, including their import and the import of builders' equipment. The Ministry of Education and the Ministry of Labor are also directly concerned with certain aspects of the building industry. Owing to the fact that there is a tremendous amount of work to be done by all the other departments, Roads, Dams, Bridge, Water Supplies, and Irrigation, the Housing Department seems to be treated as the Ministry's poor relation and receives scant attention. A certain amount of duplication exists in the work of the Ministries of Economic Affairs and Public Works in connection with research into new building materials which is not conducive to economy in the employment of technicians.

3. Improvements in the building industry would have been facilitated (at least on the administrative side) if a Ministry of Housing had been set up for all housing, ranging in scope from town and country planning down to small individual dwellings. The Ministry of Public Works and Power and the Ministry of Economic Affairs agree upon the fact there is a serious shortage of dwellings and building materials. However, no precise data has ever been compiled regarding the extent of the shortages or the materials. No definite plan has been worked out for increased production or to start research. The possibility of reducing the gap between needs and present production by exercising greatest economy in use of available supplies does not seem to have been fully investigated.

4. At present the standards for architectural design are notable for their extravagant use of valuable materials, some of which are actually imported. Many factors are responsible for this situation: designers, contractors, methods employed, materials available, and the regulations controlling all these factors.

5. Architectural design. At present there are five qualified Indonesian architects, four of whom are civil servants. All are reputed to have studied at Delft University. There are two foreign architects and about fifty consultant engineers who undertake most of the work of architects. Most of these consulting engineers have business connections with commercial firms. At the lower level there 250-300 self-styled architects who are anything from competent draftsmen to assistant architects. They have some training either through working in government offices, with contractors, or by self-training after leaving Technical Middle School. They work usually in medium-sized towns and the majority are also building contractors, or manufacturers or suppliers of building materials.

6. In general there is a marked lack of information on architectural developments abroad. There is a strong tendency to follow "colonial style" by conservative design. There is more often a desire to please the client rather than to adhere to the design.

7. Local training in architecture is obtainable at the Technical High School at Bandung which has an Architecture Section with (at present) 297 first-year,

37 second-year, and 12 third-year students. The third-year students began as a class of 30 in 1950-51. The 37 in the second year are the balance of 121 who entered in 1951-52. In theory, the whole syllabus can be completed in 5 years, but the average time taken to obtain the equivalent of a Master of Arts degree is eight to ten years. In fact only one third-year student appears to be qualified to attend the Ecole des Beaux-Arts in Paris. The architecture syllabus includes much technical and scientific work which, if adequately studied, would produce construction engineers rather than architects. Insufficient attention is paid to the adaptation of buildings to local climatic conditions. There is no association or union of architects to look after professional interests. All these conditions can be improved in time by reforming the Architecture Section of the Technical High School and by providing the opportunity to gain experience abroad or in Indonesia. However, a slight change in policy regarding the designs of building schemes financed by the government would help improve the actual situation. All building at public expense is controlled by the Building Department of the Ministry of Public Works and Power which has its own central office with limited staff. When private architects have to be called in order to complete the work within the financial year which has been budgeted, he has to produce hurried plans no better than the government product.

8. The Department of Government Building has an elaborate organisation and administrative machinery. It has its own Central Drawing Office with a limited staff for preparing plans for the more important buildings, such as universities, hospitals, secondary schools, ministries, etc. The same procedure is found at the provincial level. A Provincial Office or Inspector of Public Works is responsible for the maintenance of government-owned buildings, the issuing of building licenses, the enforcement of existing regulations, the allocation of contracts, and the supervision of contractors' work throughout a very wide area, and also for drafting plans or projects not sufficiently important to be the concern of the Central Drawing Office.

9. Conditions are worse than in the Central Office. The provicincial staff is extremely limited to one technician, a few clerks, and one or two draftsmen as a rule. Local officials prefer to undertake additional work of preparing plans and specifications rather than go through the complicated procedure of obtaining authorization from central administration to commission a private architect, and then to submit his plans for approval.

10. The People's Housing Department was established to deal with low-cost housing problems. Although it is subsidiary to the Ministry of Public Works and Power, it seems a bit more independent in spirit in regard to its building. The Department is very understaffed, it has enormous problems to handle, and a budget far too small for expansion of activities in the near future. At the present time, however, it has begun collecting relevant data. It has endeavored to produce standard designs for low-cost houses, and has developed a project for "aided self-help" housing. Generally, this Department is realistic, but its work is hampered by lack of means.

11. The consequences of this situation are inefficiency and non-functional plans, resulting in excessively large buildings and difficulty in organizing the services to construct them. Buildings are unsightly, uncomfortable, and costly, with features that are out-of-date. Second-rate western architecture is adapted to local climatic conditions. In a country where so many new buildings are needed, the profession of architecture can not give a person a living without some other form of earning it. The comparative lack of government commissions for independent architects greatly limits competition among them. The situation is made worse by the fact that when commissions are obtained, the architect is obliged to follow prevailing official styles. If more commissions were obtainable, more life would be infused into the profession and the best local architects would have an opportunity to display their talents and freely express themselves.

12. Fortunately, in July 1954, a "directorate of Housing" was created, with the Government Buildings, Town and Country Planning, and People's Housing

departments placed under a common leadership. This may lead to much progress, improvements, and the importation of a foreign expert attached to the Directorate.

13. Contractors. At present only 43 firms are entitled to government contracts at national level. 31 are Indonesian, 5 Chinese, and 7 are Dutch. There is no national association of contractors. Government contracts are not tendered through invitations in the press. Public Works officials ask several contractors for estimates and then allot the contract, the unit price fixed by the contractor, who must comply with local regulation in execution of the work.

14. It is extremely desirable to revise regulations governing contracts so as to produce keener competition among contractors.

15. With regard to building equipment, the majority of firms are very poorly equipped. They lack wheel-barrows, correct type of shovels, bench clamps, etc. Aggregate and bricks have to be unloaded by hand, increasing already high costs. This all leads to a great deal of sub-contracting.

16. Control and responsibility. In the matter of control and responsibility there are two alternatives. A plan may be designed by a government official and executed by a contractor. A plan may be designed by a private architect or engineering office and delegated to a contractor. Very often, in the first instance the designer can supervise the execution of his plan, thus any mistakes can be remedied at the expense of the government, or conceal them, or shift responsibility to the contractor. For this reason the government is reluctant to extend its list of contractors eligible for government work. In the second instance, there is no real guarantee of satisfactory results as the architect and contractor work entirely separately, although the period of responsibility for the designer is 3 years, and 8 years for the contractor.

17. The usual practice is for the government contract to include 10 per cent additional to quoted figure to cover risks. No system exists for insurance of building. The present system results in:

1. Oversized frames in buildings, due to low working stresses in materials.
2. Great reluctance on the part of the government to adopt new methods and techniques.
3. Even greater reluctance to extend the list of contractors entitled to receive government contracts, because officials are afraid of possible technical errors.

18. An insurance system would give administration greater security, and by extending the list of contractors, would increase competition, with the benefits that such a policy provides.

19. Part II, Economy of materials. It has been mentioned that economy in the use of available supplies of materials would help to solve the problem raised by present shortages. There is great waste of materials in the usual type of Indonesian house as compared with that worked out by the People's Housing Department for a family of five, built with the same local materials, when each item and its quantity are listed. Unsuitable plans are another reason for the waste of materials. Orientation is bad, interior spaces are poorly planned, there is a lack of good ventilation, high ceilings are used; to note the four chief mistakes common to all parts of Indonesia, but are preponderant in urban areas.

20. Part II. Indonesia's needs. Factors to be considered in an estimate of the country's needs in building materials and dwellings are:

public works
industrial and housing programs

priorities fixed by Planning Board
exact figures for present production
rate of population increase
present condition of existing building and their replacement rate

Only data existing:

certain population figures
incomplete production statistics
no housing census since 1930
no future programs
no priorities yet decided.

21. Figures now compiled therefore no more than experts' rough estimates based on available data covering present position, and a calculation of probabilities in the near future, which will need correction in light of more precise data, and adaptation to economic policy of government. In view of the family structure, a separate dwelling must be provided for every two persons between 20 and 25 years after birth. At the present rate of population increase the per cent is 1.23, while the urban rate is 2.93, thus urban housing requirements are 2.4 times greater than in the country.

22. There are three categories of houses: Masonry houses with permanent roofs, other houses with permanent roofs, and other houses with temporary roofs. It is estimated that 150,000 of the second category houses are built in rural areas every year by owners themselves, and in the last category, houses will continue to be built until 1960 when more permanent materials come into the market.

23. No provision can be made for replacement of out-of-date country dwellings because a very large quantity of materials is needed for additional building.

24. Three five-year plans are outlined in tabular form for building through 1969. In the first period, there is a time of preparation including building basic factories with foreign management to meet the needs in 1960, training technicians abroad, and intensive survey of natural resources. The second five-year plan includes extension of basic factories and building new ones with foreign management, training technicians in the factories which are managed by foreigners, and completion of the survey of natural resources. The third plan includes extension of factors already in operation under Indonesian management, other ones under foreign management, new factories built under foreign management but beginning operations under Indonesians, and beginning of research of new possibility with the results of the resources survey. Dwelling units are allocated to each period for construction, with expectation of slow increase in number and quality of building materials, but the objective is permanent housing at reduced cost. Shortages are also estimated, and the price of materials in order to draw up a plan for many years ahead.

25. Part IV, The building materials industry. At the present moment production of building materials is placed on the same footing as small handcraft industries. Thus, there is no recognition of its importance although it is imperative that vast expansion occur in the production of building materials.

26. The main division of the industry are:

A. Binding agents: Cement, lime, gypsum

B. Aggregate: Trass, vermiculite, sand and gravel

C. Cement products: Asbestos cement, hollow blocks, roof tiles, floor tiles, pipes.

D. Ceramic products: Bricks, floor tiles, wall tiles and sanitary ceramics, roof tiles, refractories.

E. Wood products: Wood, hardboard, bamboo

F. Other products: Building hardware

27. A. Binding agents: The estimation of total requirements of Portland cement in 1960 is 1,250,000 tons as against the figure 770,000 tons given by J. G. White Eng. Co. in August 1951. Further requirements, probably underestimated, to cover the building programs are 2,500,000 tons by the end of 1964 and 3,900,000 tons by the end of 1969. With a population of 100 million in 1969, production of 39 kg. per capita is considered normal in comparison with India, Pakistan, and the Philippines. The only plant at present operating is the Padang Cement Factory, which probably is not capable of production exceeding 150,000 to 200,000 tons a year when the present maintenance program has been completed. The number of sites with available raw materials, fuel, transport, and water are not many. Gresik, East Java, is already surveyed and planned; Pamotan, Central Java, was surveyed by the Japanese Army, which started building a factory; Tjibadak, West Java, has been roughly surveyed, but the quantity and quality of raw material need checking; Makassar, Sulawesi, has been surveyed by the Japanese Army, which built a factory there, now destroyed; and Samarinda, Borneo, has had no proper survey made, but Mr. Wood, the glass expert, has reported the presence of raw materials.

28. Padang Portland Cement Factory (Indarung Factory). The production in 1954 was an estimated 140,000 tons a year with four kilns. It was started in 1912 at a third of its present output. There is no room for addition to the present machinery. The company, being Dutch, is reluctant to increase its investment.

29. Suggestions for improving quality and lowering costs include:

Limestone quarry: replace present shovel by larger one. (Kiln often stopped for shortage of limestone.

Clay quarry: use small shovel from limestone quarry for clay extraction and an automatic device for unloading lorries coming by aerial cable way.

Fuel: Use oil instead of powdered coal; the substitution of oil for coal will simplify machinery and reduce labor costs.

Kiln: Reline all kilns with proper refractories, especially if switching to oil; it is advisable that the same clinker cooling apparatus be adopted in all kilns.

Storage: The present procedure of stocking cement in bags is not advisable in view of the wet atmosphere.

Packing: There is no reason for not increasing the size of the paper bags from the present 42.5 kg. to 50 kg., which would reduce handling, reduce the quantity of paper imported, and increase storage capacity.

Laboratory: This has the minimum equipment with no "sample kiln" for testing slurry at the temperature of the kiln.

30. The factory, even if modernized and modified as proposed above, will not likely produce more than 150,000 to 200,000 tons a year.

31. Gresik should have an output of 750,000 tons a year instead of 250,000 tons originally planned, with possibility of expansion up to 1.5 million tons, using the same plant. The reserve of raw materials has been estimated as sufficient for sixty years at 250,000 tons a year. For new increased output figure, the raw material requirements (mainly limestone) for the same sixty year period would be 68,000,000 tons. This factory expected, using the wet-process, to be re-planned with initial output of 750,000 tons per year. There is one possibility regarding cement factories that must not be overlooked, that of carrying the clinker instead of cement packing it in paper bags or drums, when long distance transport by ship or rail is involved.

32. Pamotan has raw materials as follows:

Limestone: Depth of deposit is 10 to 40 M. apparently. The workable area is a minimum of 300 ha. The approximate reserve is 110 million tons, sufficient for fifty years at the rate of 5 years at 375,000 tons; 5 years at 750,000 tons; 5 years at 1,125,000 tons; and 35 years at 1,500,000 tons.

Clay: The workable area is 150 ha; the thickness is 4 mtr.; the possible reserve is 7 million tons. There is good composition although there is a low Fe_2O_3 content.

Sand deposit: The workable area is 300 ha; the thickness is 4 to 6 mtr.; the possible reserve (in dry product) is 7 million tons. The sand may contain CO_3Ca, owing to the proximity of the limestone deposit, but the MgO content as shown by analysis is much under the maximum tolerated in Portland cement.

33. Process. The correct composition of the mixture depends chiefly on the proportions of clay and sand. Pyrite (to make up percentage of Fe_2O_3) and gypsum must be imported, but in quantity so small as not to constitute a bottleneck. The process, owing to a mixture problem, will probably be wet, if materials can be mixed in a slurry. Estimates will be checked on the basis of an analytical survey after a drilling campaign.

34. Transport facilities and marketing. There is already a branch line linking up with the main track of the secondary line, Rembang-Bodjonegero at Pamotan station (132 km. track.) This branch line, 0.576 km. in length, is in good condition and only needs cleaning; one small 5m. span wooden bridge is rotten and needs replacing. Rembang harbour, 17km. from the factory, would be the shipment point for coastal boats.

35. A pipe-line working as conveyor with pneumatic transport pump would eliminate handling of bags and ensure bulk loading on boats with minimum expense, or at least food packing station at harbor.

36. Tjibadak has raw materials as follows:

Limestone: Site is practically on top of limestone deposit of Priangan.

Clay: There is no available analysis of clay deposit.

Water: The river is close to the site, providing all water needed for wet-process, even in dry season.

Fuel: Would be brought from Djakarta by railway.

37. There is no shortage of labor and the market is sufficient. As to size, there are two possibilities: it could go into production later than Gresik, Pamotan, and Makassar with an output of 300,000 tons a year, or the rate of expansion of either Gresik or Pamotan could be reduced and the total production completed by a large factory with 375,000 tons a year.

38. Concerning the possibility of a cement factory near Makassar, where there had been one built during the war and now destroyed, it would find a good local market in view of the need for basic equipment in this part of Indonesia.

39. Samarinda, Borneo has avilable 11 million tons of raw materials. A first estimate for the plant is $1,000,000; due to the small size of the reserve, the factory would not be large, with approximately 200,000 tons a year.

40. Lime. The shortage of cement and the availability of this raw material help account for its present magnitude as an industry, but at the present level of production the lime industry cannot meet the growing needs of the country.

41. It is suggested that five companies be formed: three in West, Central and East Java, and the small Sunda Islands; one in Sumatra; and one in Sulawesi-Maluku, in order to reduce as much as possible the foreign technical staff who would be indispensable at the beginning. At the initial stage, three lime specialists would be required for a period of from three to five years, each assisted by one geologist with equipment, attached to the Dept. of Industry with duties to survey the resources, plan and modernize factories, and to train technicians.

42. Gypsum. This valuable material has been little investigated. Indonesian needs for cement-making only are 20,000 tons by the end of 1959; 40,000 tons by the end of 1964; and 70,000 tons by the end of 1969. For plasterboard to complete the hardboard production for coiling slabs, the needs are 66,000 tons by the end of 1959; 246,000 tons by the end of 1964; and 584,000 tons by the end of 1969. The present situation is disappointing.

43. Gypsum is known to exist at the following places in Java: Krawang, Purwakarta, Tjikeusal (Paliman), Paroengdjadja, Kragan (Djepara), Bandjaredjo (S.E. of Kendal,) Baturetno (near Kendal), Ngaplok, Gresik, Tegalombo, Sedajoe, Boekoel, Arosbaja, Timurlaut, Sana, Pradjekan. So far, no large deposits for cheap exploitation are known to exist. The best spots at present in Java are near Madioen, at Sedajoe and Boekoel, and near Tjepoe, East Java.

44. Makassar. The quantity per Mtr^3 is too small to yield product worth transporting; at present there is no appreciable local market. This deposit is not considered of any economic interest.

45. Central Sumatra. It is not definitely known that a gypsum deposit exists here. Unless large deposits are discovered through geological surveys, Indonesian cement production will depend on imported gypsum. However, in view of the large areas not yet surveyed, there is considerable hope that economically workable deposits will be found.

46. B. Aggregate. There are 45 known deposits of natural trass. Its usefulness is very much reduced by the poor quality of many of the deposits. The only places where trass could be used are in West Java, Nagrek and Tjimerang; in Central Java, Muriah, Kalisoro, Wates, and Proepoek; in East Java, Pandahan and Semen; and in Celebes, Tomohon (near Manado.) Even a large plant with a production of 120,000 hollow blocks per month is turning out a product which is not always safe, and the correct standard is attained only by adding Portland cement to the mixture. The Testing Materials Laboratory has started research into ways on raising the quality of the trass products, but shortages of staff, equipment, and funds have not permitted the development of this research.

47. Vermiculite. The Island of Celebes could be a source of supply.

48. Sand and gravel. Indonesia possesses much excellent aggregate for cement and mortar making. Current market prices, especially gravel, are extremely high, owing to labor required for hand sieving, the low proportion of gravel in sand-gravel mixture, and the cost of transport and handling. It is recommended that aggregate centers be organized at carefully selected spots with mechanical excavation, a large stock, sizing screen, and transport to stock with a hopper for direct loading. Actual production used in house building alone probably reaches no less than 2,700,000 mtr^3 and the shortage is estimated at 1,845,000 mtr^3 by the end of 1959, 6,630,000 by the end of 1964, and 10,410,000 by the end of 1969.

49. C. Cement Products. Shortage of cement, equipment, and skilled labor has led to limited production of asbestos-cement, wall blocks, and roof tiles, with a small output of pipes and sanitary equipment. Woodwool cement, foam concrete, and prefabricated elements of reinforced concrete for floors is not produced.

50. Asbestos cement. The only factory at present producing "eternite" is a European plant using fiber imported from South Africa and Padang Cement. The product meets the requirements and quality fairly regularly. It is becoming necessary to prohibit the use of "eternite" for ceiling slabs, enabling coated or treated bamboo to come to its own again in permanent buildings. A recent survey gives the Halmaheira Is. as having large deposits of asbestos.

51. Cement floor tiles. A large percentage of the production consists of colored floor tiles, in poor taste and costly, due to the high price of imported dyes. An example is that of a small factory with two machines, which purchased an amount equivalent to Rp. 123,000 in foreign currency from sterling area for mineral dyes, yet is asking for a government loan for a new machine abroad.

52. Cement blocks. The use of cement blocks is still beginning in Indonesia. There are few large mechanized plants - one in Bandung, one in Surabaya, and one in Padang, with some large contractors in Djakarta making them for their own use. These plants have one point in common; they are trying to replace the correct mixture of cement and aggregate by lime and trass and aggregate with a very small amount of cement. The result is that they are using twice as much concrete as necessary.

53. D. Ceramic products. The raw materials position is good, for supplies are plentiful, they are close to the cities, well-distributed throughout the country, and there is no long distance transport.

54. Bricks. According to the Ceramic Institute estimate, the total production is 2400 million per year with 2500 plants. The quality is poor and the prices are extremely variable. No attempt has been made to improve the quality or to reduce the price, as the market easily absorbs total production. The needs are 198,000 million a year by the end of 1959; 3,408,000 million a year by the end of 1964, and 5,598,000 million a year by the end of 1969. The correct size for a production unit is a capacity of 5 million pieces a year at a cost of Rp 6,000,000, one-third in foreign currency. The same plant, with a simple adjustment, could produce hollow bricks for concrete floors. The possible sites are in West, Central, and East Java, Outside Java, Bali, Bangka, and Kalimantan.

55. Floor Tiles. Although these are not produced at present, there would be a wide demand for good quality, cheap tiles. The total needs are 334 million per year at the end of 1954, one-third of which is expected to be met by the ceramic industry. The production would start with 110 million per year. The correct size for a production plant would be 24 million per year, with suitable sites at Plered, Kebumen, Malang, Koedoes, Karangpenang, Krawang, Ternato, Medan, and Lombok.

56. Wall tiles and sanitary ceramics. There is a great demand for glazed white or light colored wall tiles, especially for bathrooms. At present there are 1,600,000 pieces imported. There is also a great need for sanitary ceramic equipment, such as glazed pipes. Total needs are estimated at 315,000 pieces of sanitary equipment and 20,000 tons of pipe by the end of 1959; 690,000 pieces of sanitary equipment and 40,000 tons of pipe by the end of 1964; and 990,000 pieces of sanitary equipment and 80,000 tons of pipe by the end of 1969. Possible sites are in Java or Outside Java.

57. Roof tiles. The position is similar to ordinary bricks. 95 per cent of the production is from small plants with an output of about 1000 a day. The

tiles are small (25 to 28 per m^2) at Rp 0.50 to Rp. 1.00 apiece. The plan for the mechanization of small industries (drawn up by TCA, now FOA) provided for the modernization of 18 small plants throughout Indonesia at a total cost of Rp 18,000,000. This scheme is not an economic proposition; the results obtainable - an absolute maximum output of 2500 per day per plant - do not justify the amount of foreign currency invested. (Rp 19,000,000 plus the cost of training 18 managers, etc.)

58. The production of larger tiles is much more profitable. One factory can produce 40,000 (13 per m^2) tiles in the same time from the same kind of clay for an investment of Rp 3,000,000 plus Rp 2,000,000 in foreign currency. One manager, two mechanics, and local workers make up an operating plant. Even when 18 plants were producing three times as much, i.e., 7000 tiles a day, they did not reach the production figure for a normal factory, and it costs 3.6 times as much. If Mechanization Plan proceeds, these 18 factories will deprive the country of the investment required for 3 normal factories and of 3,000,000 m^2 roofing material which is badly needed. The recommendation is that the government abandon this plan and concentrate on large factories which can meet the shortages, which will be 32,000,000 tiles by the end of 1959, 377,000,000 by the end of 1964, and 469,000,000 by the end of 1969.

59. Refractories. The present position is one factory in Surabaya, European-owned, which will have an output of 2000 tons per year. Another, with the help of the Ceramic Institute, started small-scale production. The shortages will be 8000 tons by the end of 1959, 1800 tons by the end of 1964, and 3300 tons by the end of 1969. The proposed sites for production are best if harbors; therefore, Djarkata, Surabaya, Semanang, Palembang, and Makassar are suggested. The best size for a production unit is 4000 to 5000 tons a year.

60. E. Wood Products. The latest available statistics (1953) give the total production as 1,5000,000 m^3 timberwood and 2,200,000 m^3 as firewood, with the Dept. of Forestry controlling the sales of 570,000 m^3 timber and 1,300,000 m^3 firewood. More than 50 different species were studies; many were highly suitable for construction purposes. This industry is one of the most highly mechanized in Indonesia. Some sawmills are large, with centers in Djakarta, Semarang, and Jogjakarta, all well-equipped. The average sawmill production is 60 to 70 m^3 per month. The work is rather rough and prices are high. The Five Year Plan will enable joiners' industry to expand production. If all designers used the minimum necessary quantity of wood, increased production would be sufficient to build 220,000 minimum units. Only when this figure is reached, should new sawmills and joinery shops be established. Experts in joinery design and managers with experience in the trade are most useful.

61. Hardboard. This is not yet produced in Indonesia, but there are three projects, all based on the use of coconut fiber. Estimated requirements are 3,150,000 m^2 by the end of 1959; 5,400,000 m^2 by the end of 1964; and 7,200,000 m^2 by the end of 1969. There are three factories: Banjuwangi, with an output of 600,000 m^2 per year; Minahasa with an output of 1,000,000 m^2 per year; and Serang, with an output of 60,000 m^2 per year.

62. Bamboo. Bamboo is suitable for some permanent construction work; it can be used for ceiling panels, rafters for common tile roofs, for <u>atap</u> roofs, as wall panels with a wooden frame, and possibly wood-wool cement. As regards reinforced concrete with bamboo, it would be better to introduce bamboo for shells, coated on top and underneath. When the whole has hardened, the bamboo would serve as a reinforced base, chiefly in compression. An inconvenience with bamboo is the difficulty of assembly. Even with these limitations, there is plenty of work with the bamboo industry, already producing 4,000,000 m^2 of bilik a year; reaching 12,300,000 m^2 at end of 1969, a large contribution to the building materials industry by means of small-scale production.

63. Other products. Building hardware accounts for the importation of 24,000 tons of nails a year and 2500 tons of door and window fittings. One factory at Jogjakarta is on a semi-mechanized basis, and the demand is not met. This

industry should be encouraged, especially where there is under-employment, but there must be checks for good quality. In this way, importation can be stopped. For nails, there is the problem of importing raw materials from abroad. This is purely a matter of local initiative, but the government might make a start if private individuals fail to provide for the product.

64. Part V. Present state of development project and recommendations. The establishment of a sound and coordinated program for housing development is hampered by the responsibility of a number of Ministries and Institutions. The recommendation is that there be Housing Center at the regional level. This center would be useful in providing information, revising regulations, defining standards, and carrying out research through the intermediaries of the various institutes. It is strongly felt that, prior to and parallel to the organization of this center, that the right atmosphere be created by arousing a large part of the public out of its phlegmatic attitude and tolerance of the present state of affairs. The delay, for instance, in erecting new cement plants and modernizing the ceramic industry shows that the urgency is not fully realized. Another proof of lack of concern is the small scale of the Housing Dept. and the fact that building materials are treated as a small handicraft industry.

65. The recommendations for the next five years, the period of the initial work, are as follows:

1. It should mainly be the concern of the Ministry of Public Works, the Dept. of People's Housing, the Government Building Dept., and the Town and Country Planning to deal with designing, contracting, and regulations, with a view toward reducing waste material.

2. It should be the responsibility of the Ministry of Economic Affairs for Materials Supply and Research to find fresh sources of supply.

3. The Ministry of Education and the Ministry of Labor should deal with the education of technicians and workers of different grades.

66. Part VI. Recommendations for consideration by Ministry of Public Works and Power

67. A. All architects should be given the opportunity of being commissioned by the government, so that provincial and central offices of the Ministry could devote itself to the general supervision of its programs, including the budgetary aspect. To assist the government in selecting suitable architects and contractors, two foreign consultants should be attached for a period of from three to five years, one architect with a fair knowledge of town planning, one civil engineer with contracting experience.

68. The conditions of work would be as follows:

1. Would assist in selecting the most able architects and contractors for the purpose of increasing their knowledge and both theoretical and practical skill.

2. Persons receiving contracts to design or construct buildings would execute them under said consultants.

3. The largest projects would be planned in the first instance by the said consultants, assisted by Indonesians from the ranks of architectural students or from the offices of private architects. The names of these assistants would be submitted to the government for approval. In future, they may be selected through competitive examination for local architects.

4. Successful contractors would receive all technical advice needed, and when feasible, provided with tools and small-scale equipment on a credit basis.

5. It would be the responsibility of the consultants to influence the design and execution and to introduce new materials and techniques.

6. The consultants would assist officials in town planning problems and in collecting essential preliminary data.

7. The consultants would encourage architects and contractors to form professional associations. Such local associations would form later a national federation which would stimulate development of the building industry and be of great assistance to the government.

69. B. Tenders would be publicly invited for all contracts. There would be a system of sealed envelopes, time limits for tenders, and all existing regulations strictly enforced. For important public buildings, i.e., universities, large hospitals,etc., there would be nation-wide competition.

70. C. Competitive tenders may involve some risk. It is therefore suggested that an insurance company be set up to cover any risk, to work in collaboration with an office for control of building programs.

71. D. The Ministry of Public Works would take the initiative in radically revising the regulations dealing with town planning, construction, and materials.

72. Town planning and house building. The regulations would be amended in enforcing the application of "Practical Rules for Designing in a Wet, Tropical Climate."

73. Construction. With regard to reinforced concrete and stell frames,it is advisable to adopt the new regulations issued by the French Ministry of Construction, which will result in very economical designs and more than necessary degree of safety. For wooden frames, the assistance of the Forest Research Institute and a wooden frame expert is needed.

74. Masonry. There should be more liberal working stresses allowed for various types of masonry, and the regulation requiring concrete posts in brick walls should be abolished. The use of coated bamboo for walls and partitions would be allowed.

75. Roofing. "Eternite" would be prohibited in flat slabs for ceiling. The production and use of large roof tiles would be authorized and encouraged.

76. E. Attention should be paid to the foremen, since the quality of the work depends to a great extent on their skill and authority. There are too few foremen in Indonesia to be spared for training abroad in new methods. A suggestion is that a team of foreign foremen of same nationality be attached to each consultant engineer for instructions to the local foreman. A minimum of three foremen per consultant engineer is felt to be necessary, one for main concrete and masonry work, one for plastering and finishing work (floors, etc.) and one for carpentry and woodwork. It appears the presence of foreign foremen is indispensable concerning the introduction of new tools and techniques.

77. Part VII. Recommendations for consideration by Ministry of Education. The most urgent needs may perhaps be met by the consultants' training local architects and by sending the best students from the Architecture Section of the Bandung Technical High School abroad for studies.

78. The present educational system to be reformed, considering two alternatives:

A. The Architecture Section of Bandung Technical High School should be completely reorganized along the lines of the Ecole Nationale Superieure des Beaux Arts in Paris. This would involve a revolution in the T.H.S. system and would perhaps meet many obstacles.

B. With a few changes in the present curriculum to shorten it and emphasize its practical side, the Architecture Section could be transformed into a section for constructional engineers, as badly needed as architects. The course for Constructional Engineers should be reduced to three years.

Such a complete reorganization necessitates staff, buildings, and credits. UNESCO is recommended for examining methods of introducing reforms.

79. Part VIII. Recommendations for consideration by Ministry of Economic Affairs. The need to build and modernize factories has already been pointed out, but a few details follow if the price of building is to be as low as possible:

A. The size of the factories should be planned to be sufficiently large as an economic proposition and large enough to suit the market.

B. Factories should be planned with the most modern mechanized process.

C. The quality of the product must constantly be checked by the Testing Materials Laboratory.

D. Even though financed by government loan, factories should work on a competitive basis with privately financed factories in the area.

E. The appointment of one commercial firm as the sole agent for a factory is to be prohibited.

F. Under the Technical Assistance Program suggested below, the factories are to be allowed to engage the foreign technical staff needed, with the condition that each technician thus engaged be allowed to train at least one young Indonesian named by the Dept. of Industry.

G. There must be foreign technical management of new factories for at least the first five years. Future Indonesian managers and technical staff will be trained at the actual factories where they will work.

H. The grant of government loans for factory equipment must be conditionally used at 100 per cent capacity. This applies also to existing wood working factories and carpenters' shops, without fresh ones being established at least during 3 years.

I. Foreign staff is also much needed in various government institutes, especially the Testing Materials Laboratory, for at least 15 years.

80. Technical assistance to the Ministry of Economic Affairs should take the form of a comprehensive Mission for the Development of Building Materials, composing one Chief of Mission, with wide experience of industrial management; one Production Engineer, working mostly as project manager; one Standards Expert, working mostly with Testing Materials Lab.; one Archivist and Technical Translator; one Administrative Officer, with necessary staff; and one Indonesian official, attached personally to the Chief of the Mission, to act as Public Relations Officer.

81. The specialists attached to the Mission would be three cement and lime specialists; two quarry and aggregate; three moulded cement product specialists; three brick and tile factory specialists; one glazed sanitary ceramic specialist; three wood-working technicians; and three geologists.

82. These specialists, working at the level of Provincial Inspectors of Industry, would each require one Indonesian assistant, who had already worked in the same field or who had at least a technical background and enough knowledge of English. According to the present practice, the Indonesian Govt. is responsible for allowances, lodgings, and office accommodations. In general, the Mission would be self-supporting.

83. In making the above recommendations, sight has not been lost of the large amount of work remaining for Technical Assistance to carry out in Indonesia. It must extend its activity within each industry, planning further ahead than a yearly budget allows.

Massachusetts Institute of Technology. Techtalk,
March 12, 1957.

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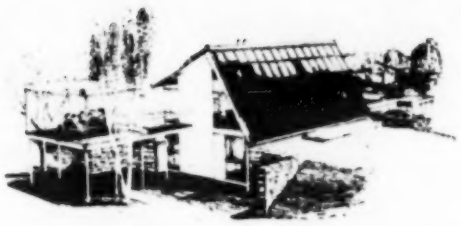

As planned....

.... in progress

"We're a middle income family with conservative tastes. Do you recommend solar house heating for us?" This is a question which the M.I.T. Committee on Solar Energy has long since been accustomed to dealing with.

The committee, which was set up in 1938, has so far shed much light on "methods for using the energy from the sun." The researchers' major publication, Space Heating with Solar Energy, was one of the first in its field and has helped interested sun-users from the Atlantic seaboard to Death Valley in California. They have also built three solar houses. The most recent of these was on Memorial Drive in Cambridge, but its solar efficiency was destroyed by a small fire in the electrical system and by unusually zealous firemen. A new replacement (see left) is now under construction in Lexington, Mass.

According to present plans, the house's south-facing solar collector and the energy-storing water system connected to it will almost do the job of keeping the thermostat up and heating all the water needed by the occupants. But to operate most efficiently -- and unless our warming winters warm up considerably more -- it looks as if the house would require auxiliary heat during the critical months of December, January and February. Even with the help of oil (gas is more expensive), the solar experts calculate that on a commercial basis solar houses will cost no more than the various heating systems currently in use.

In case you have any curiosity about this new solar scheme of things, the house will be on the market sometime this summer.

Space frame systems: 2, R. Buckminster Fuller at McGill. (Canadian architect, March 1957, vol. 2:3, pp. 23-26, with illus.)

Text and illustration are reproduced below.

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Buckminster Fuller's extraordinary career of structural experimentation is well enough known not to need any full description here: from the development of the Dymaxion House in 1927, through his first large-scale attack on geodesics in 1947, to his current inclusive preoccupation with Comprehensive Designing and synergetic geometry. Fuller has continually provoked comment, ridicule and admiration.

This article chronicles a recent episode in Fuller's activities — the construction of a geodesic dome during a two-week student seminar at McGill University, Montreal, last fall.

In February, 1956, R. Buckminster Fuller, the American designer-inventor, gave a lecture to students of the School of Architecture, McGill University, which lasted an uninterrupted four and half hours, stimulated the audience greatly and was the cause of discussion long after Fuller had left. As a result, the Architectural Undergraduate Society asked him to conduct a seminar, during which a dome would be built at McGill. Although Fuller has conducted such seminars at many American universities, this was the first at a Canadian university.

To raise the necessary funds, the students put to-

gether a short brochure, with photographs, explaining the ideas behind Fuller's work and the aims of the seminar. They had an interview with R. E. Powell, president of the Aluminum Company of Canada and talked with company executives. The company donated $3,000 to finance the project.

The seminar started two weeks before the beginning of the fall term, 1956, and each of the 29 participating students contributed $25 to its expenses.

Fuller talked with the group for the first two days. Then the group organized itself for work along the lines of industrial procedures for prototyping. Although Fuller had made preliminary calculations before his arrival, the project was in effect carried out complete in ten days, including the bulk of the mathematical calculations, the purchase of materials, fabrication of components and final erection of the dome.

The geodesic dome, a structure based on the geometry of the sphere, enclosing a maximum of space for a minimum of effort and materials, is in essence a hemisphere.

The dome built at McGill appears as an aluminum hemisphere whose exterior surface is patterned by a diamond-like grid of olive green tape. It has five hexagonal windows approximately half way down from the pole of the sphere, along with five doors evenly spaced around the perimeter of the dome. The dome consists of about a hundred diamond-shaped aluminum components: each component has two planes on the interior surface which are triangular in shape and whose common side is the long diagonal of the diamond. Because of the slope of the two triangular planes from the common long diagonal of the diamond there is a pleasant pattern of shade and light on the interior surface of the dome. The dome spans 28 ft. and is 18 ft. at its highest point; it weighs approximately 1,000 pounds.

The mathematical work on the McGill dome was done by a group of three students.

The basis of any geodesic dome is an icosahedron, which is the largest omnitriangular system made up of equilateral triangles. An icosahedron has 30 edges, 30 domains of edges, 12 vertices and 20 faces.

At the beginning of the project the group chose a six-frequency icosahedron as the basis of the dome. This means that all the edges were divided into six equal parts from which, accordingly, each domain could be divided into nine diamond shapes, of three different sizes. Since windows were left at the apexes, only two sizes of diamonds had to be calculated.

In calculating the diameter of the dome, the width of the available aluminum sheets (36 inches) was the determining factor. The maximum value possible for the outer diameter was calculated to be 28 ft.

Spherical trigonometry was used as a basis for all of the calculations. A Monroe calculator and eight place trigonometric tables were used. The lengths of the sides of a basic diamond, in degrees, and the chord factors, were taken from Fuller's master sheets.

Using the basic formula — the length of a side equals the radius multiplied by the chord factor, where the chord factor is a function of the angle subtended at the centre of the sphere and the radius equals 14 ft. — the theoretical values for the sides of the aluminum diamonds were calculated. In a similar manner the lengths of the diagonals were calculated by spherical trigonometry.

The paperboard diamonds were calculated in the same manner using a radius of 13 ft. 6 in., since there would be a six-inch airspace between the aluminum and the paperboard. The cross-section of the paperboard boxes was calculated at one third points for the size of braces and jigs, and were corrected proportionately to allow for thickness.

Since the dome was to be a perfect hemisphere, terminating at the equator, the diamonds had to be cut along the equator. The exact lines of cut on each diamond were calculated through a series of spherical triangles.

There were two basic components, diamond number one and diamond number two which differ in size but not in form. Each component is made out of a flat sheet of paperboard folded into a box-like structure. These components have a diamond shape in plan measuring about 5 ft. by 3⅛ ft. on the long and short diagonals respectively. This structure has a six-inch depth inside which are placed two reinforcing paperboard bulkheads which force the diamond box to assume a two planar surface on the interior. This duality of planes on each component introduces the shade and light pattern on the interior of the dome.

Diamond number one has four equal sides while diamond number two has two short sides and two long sides. The angle to the vertical of the six-inch side of the diamond box on the number one and number two boxes coupled with the fact that there are two different shaped structures, permits the curvature of the dome to form as these pieces are put together. Each component is covered on the flat surface (external one) with a thin aluminum sheet having a shape corresponding to the surface to which it is applied. The aluminum sheet has three-inch flap extensions on two opposite sides of the diamond for assembling purposes.

Once the organization of the group had been decided, the students separated into smaller groups, to calculate component dimensions, make and test models, obtain materials (in many cases materials were donated, or sold with substantial discounts), prepare and assemble materials and, ultimately, erect the dome. None of the students involved had any previous experience of such work, and the whole project was carried out at high pressure: students often worked up to 33 hours continuously, without sleep.

Because of this speed and inexperience, mishaps occurred. For instance, an original set of calculations had to be scrapped (no account had been taken of the thickness of the cardboard backing, in dimensioning the diamonds). In the original design, components were to be glued to each other by means of the aluminum flaps, but later considerations of demountability made the group abandon this plan in favour of self-tapping screws.

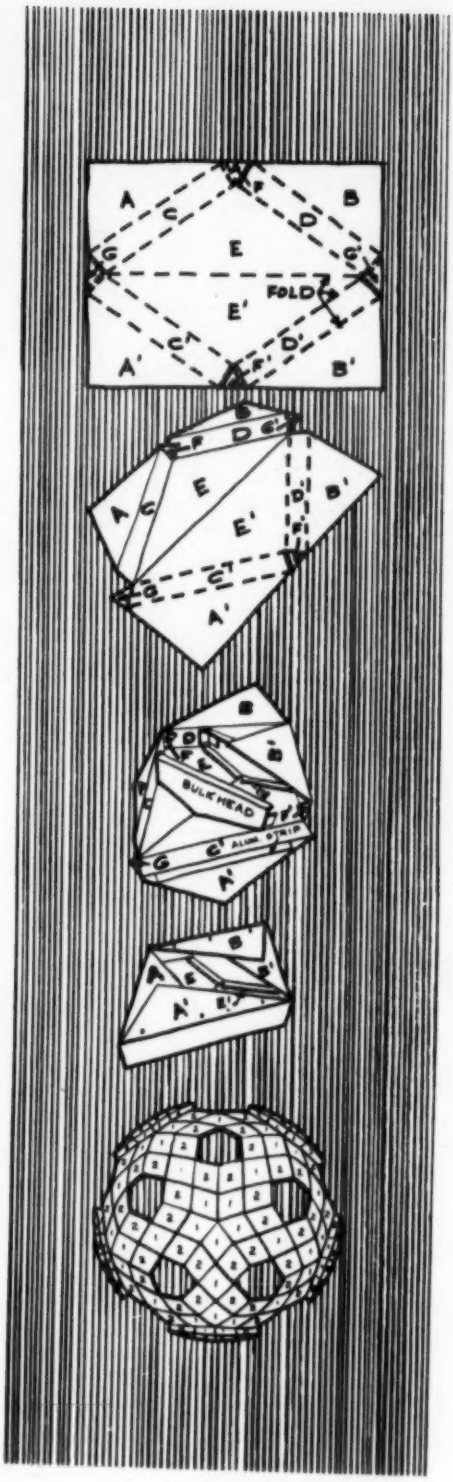
Finally the dome, which structurally was substantially complete after two days of work, was moved to its permanent site and set on an eight-inch concrete block ring foundation. It is now located on the grounds of the Montreal Building Trades Apprenticeship Centre, where the schools of architecture at McGill and the Ecole des Beaux Arts have a laboratory and workshop.

But that is not the end of the project. One main purpose was to explore the problems of living and working in the north. At present tests are being carried out in winter conditions: in the summer, the group will test the principle of self air-conditioning (for which it was designed) by opening the top. Acoustical, lighting and structural tests will also be carried out.

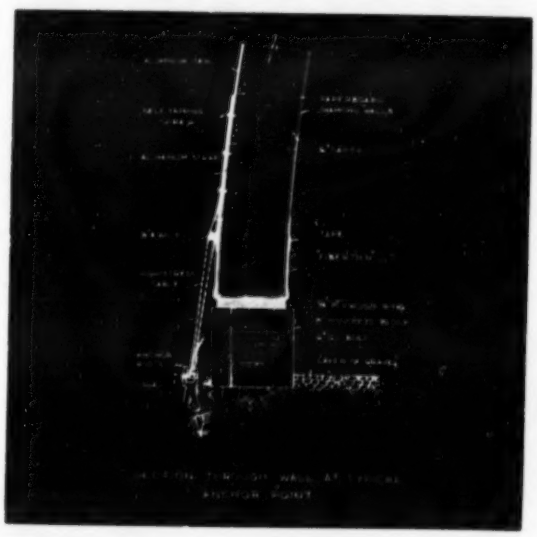
At the end of the seminar, Fuller suggested that, under conditions other than those of a seminar using voluntary labour, such a research project would have cost more than $100,000 and taken at least six months to develop. The actual fabrication and erection of this

dome from inception took ten days and cost approximately $4,500.

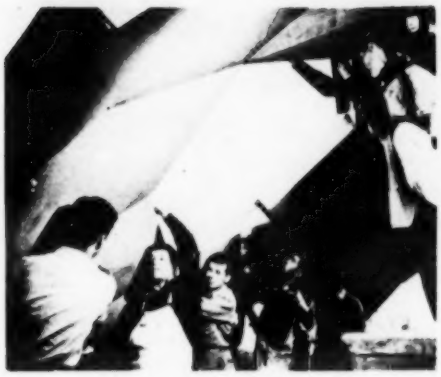
One business executive has said that it costs industry around $2,500 to house a man in the outlying districts in the north, where industry is at the moment developing. The potential of this dome is particularly interesting in the light of this figure: its lightness, easy portability, simple installation and good heating qualities add to its attractiveness. It remains to be seen whether industry will follow up the work done at McGill.



Right: four stages in the construction of a diamond component for the dome, with a plan of the dome showing the placing of the two types of diamond. Note five-pointed star at centre.



1 Preliminary studies in the early days of the "dome" seminar.



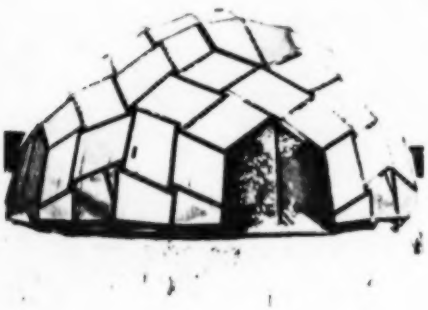
4 The dome took only ten days to erect, by inexperienced hands.

2 Fuller was almost constantly available for discussion

5 Windows provide light in winter, air-conditioning in summer.

3 . . . and to give a hand in the actual period of construction.

6 Throughout the winter the dome has undergone further tests.



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United Nations. Economic and Social Council. Social Commission. Eleventh session. Agenda item 8. Progress made by the United Nations in the social field during the period 1 January 1955 - 31 December 1956 and proposals for the programme of work 1957 1957-59. Report by the Secretary-General. N.Y., 1957. 119 [18] pp. (Distr. General. E/CN.5/326. 14 March 1957.)

1. The report reviews activities in the social field during 1955-56 and summarizes proposals for projects to be undertaken in 1957-59. The Second International Survey of Programmes of Social Development should concentrate upon three broad subjects of major importance:

   1. Community development for improving levels of living.

   2. Measures affecting peoples undergoing rapid transition especially through urbanization.

   3. Planning for balanced social and economic development.

2. There will be two seminars on urbanization organized in Latin America in 1958, and in the Middle East in 1959 or 1960. Seminars are proposed on environmental planning to be held in the Far East in 1958, on planning, organization, and administration of social services in Asia and the Far East.

3. Listed in the 1955-57 work program of the Social Commission is a project entitled, "the extension of housing for low-income groups," which includes the study of factors influencing construction costs and quality and productivity of the building and building materials industries.

4. Direct assistance in the planning, design and construction of emergency housing projects, necessitated by destruction of housing through war or natural disasters, has been provided to the governments of Bolivia, Ecuador, El Salavador, Haiti, Lebanon and Pakistan. It is suggested that the U.N. explore, in 1957-59, techniques successfully applied to problems of emergency housing and reconstruction and consider international action such as the pooling of equipment, essential materials and technicians normally employed in public works. The implications of the use of by-products of nuclear fission for the production of new building materials will also be considered in this connexion.

5. Another project which it is proposed to implement in 1958 is a seminar on Regional (physical) planning and the Location of Industry in the countries of South East Asia and the Far East. Urbanization Conferences are planned for Latin America in 1958 and for the Middle East in 1958 or 1959 which will include policy papers dealing with the physical planning aspects of urbanization. In preparing studies and reports on regional planning, experience gained in recent years in assisting government in the planning and redevelopment of cities and industrial centers will be drawn upon. These include Rangoon, Burma; San Jose, Costa Rica; Cairo, Egypt; Djakarta, Indonesia; Amman, Jordan; Beirut, Lebanon; Kuala Lumpur, Malaya; Karachi, Pakistan; Asuncion, Paraguay; San Salvador, E. Salvador; and new steel towns in India.

6. Agenda item 5 of Eleventh Session, numbered E/CN.5/327, 20 March 1957, is entitled, Financing of Housing and Community Improvement Programmes. It is the Report by the Secretary-General on the regional activities undertaken pursuant to Economic and Social Council resolution 585E (XX). This report summarizes the findings and conclusions of the regional meetings already held and points to a number of major problems that governments are facing in the financing of housing and community improvement programs. Reference is also made to various schemes of international cooperation which may be found relevant to the present context. On the basis of this information, action on the international, as well as the national level, may be recommended.

7. In commenting on past seminars on housing, the Commission may wish to note the importance of defining the role of housing and community improvement as part of general economic and social programs, and to draw the attention of

governments to the need for continuing evaluation of the role of housing in economic and social development; necessary periodic adjustments of housing programs in the light of current requirements and available resources; and giving priority to the requirements of low-income groups within current housing programs when determing the types and location of housing and community facilities.

8. In view of the fact that a large section of the population in the lower and middle-income groups might save for better housing while it would not save otherwise, the Commission may wish to suggest through the Council to governments that they consider establishing financial institutions to encourage and protect individual savings as a means to increase resources available for an expansion of housing and community improvement programs.

9. Governments should encourage the creation of, and assist in, the development and operation of housing cooperatives and other non-profit organizations including self-help projects; they should establish appropriate legislation and financial institutions required to ensure the functioning of such organizations on a continuing basis; and they should provide funds and advisory services, and where appropriate, certain materials and equipment otherwise unavailable for projects using self-help and mutual aid methods.

10. In bridging the gap between cost and ability to pay for adequate housing the Commission may wish to recommend through the Council that governments can narrow this gap by reduction in the cost of construction by assisting the development and productivity of the building and building materials industries in terms of low-interest loans and more stable or assured markets for these industries; the granting of low interest loans, capital subsidies, state-guaranteed mortgages or other appropriate financial assistance for the construction of housing and community facilities by private, institutional and public investors; the provision through public funds of housing and community facilities for families in low-income groups, and the granting of low interest long-term loans and subsidies for land acquisition and development; and direct rent subsidies to the families in the low-income groups in order to protect their levels of consumption for other essential requirements and protection of their tenure through rent control.

11. While the financing of housing and community improvement programs must be met largely from domestic sources, consideration must be given by governments to the possibility of using external sources, particularly in the less-developed countries.

12. Such sources are the International Bank for Reconstruction and Development or the International Finance Corporation, the proposed Special United Nations Fund for Economic Development which would provide grants-in-aid and low-interest, long-term loans to underdeveloped countries, and the European Coal and Steel Community composed of six member governments: Belgium, France, Germany, Italy, Luxembourg, and the Netherlands. The last is a new experiment in financing housing for workers at a low rate of interest. The Council may wish to recommend to governments that external funds be used for housing projects which will directly increase national productivity, such as workers' housing for an industrial plant, or by way of investment in basic industries such as steel mills, cement plants, timber production, power, transport, ect., which can support an active building industry. In view of the high cost of land for residential communities, the Council may recommend that new development projects should not be approved and started before adequate planning and provision against land speculation is made.

13. A meeting on financing of housing programs in Europe will be held in the fall of 1957, another will be held in Costa Rica to consider the financing of housing and the development of building and building material industries. A seminar on housing through non-profit organizations will be held in Denmark in 1958 in cooperation with the government of that country and the countries of the Near and Middle East. Regional meetings are planned for Africa and North America in 1958 and 1959.

14. The report concludes with a resolution to continue to study and to assemble information on financing housing programs from external sources, to convene experts to consider problems for persons in low-income groups, and to prepare material describing sources for financing and methods to bridge the gap between the cost and ability to pay for adequate housing.

* * * * *

15. The following extract from Press release SOC.2312, 9 May 1957, is pertinent to the preceeding reports. Ernest Weissmann "announced that the Housing Committee of the Economic Commission for Europe would again discuss the problem of financing this month and in November. Also, at a meeting in Central America later this year, he said, the financing of housing programs and the possibility of closer integration of the building and building-materials industries in this region would receive particular attention by the governments concerned as part of their effort toward general economic integration of that area.

16. "Mr. Weissmann added that, in 1958 and 1959, meetings and seminars for countries in the Middle East, in Africa, and in North America might be organized if the governments so request.

17. "The only speaker this morning was Sir Oswald Allen (United Kingdom) who remarked that, in his delegation's view, several of the recommendations made at the regional meetings could not be accepted as 'a general proposition.' Some of the proposals, concerning cooperative housing, for instance, presupposed the existence of private savings and industries which were lacking in many under-developed countries. He suggested that the Social Commission should eventually adopt a resolution which would confine itself to drawing the attention of governments to the information collected on financing of housing but which would not attempt to prescribe a choice of method."

18. Press release SOC/2316 is entitled "Social Commission completes discussion of housing." It reads:

"The Social Commission this morning concluded its discussion of the problem of housing, which had centered on the findings of recent UN seminars, technical assistance missions and regional meetings on the financing of housing and community improvement programs.

19. "The Commission adopted no formal resolution* on this agenda item, as the individual research and technical assistance projects in this field will be determined later in the session in connection with the Commission's report to Economic and Social Council should fully reflect the main points made in the debate.

20. "In essence, the Commission has considered that housing conditions have deteriorated in many areas as a result of rapid urbanization, population trowth and, in some countries, earthquakes and other natural catastrophes.

21. "It stressed the view that the financing of housing as part of over-all economic and social development had become a matter of increasing concern and that the wealth of information assembled by the United Nations Secretariat could usefully support direct technical assistance to governments in this field.

22. "A majority of members emphasized the role that governments must assume in financing and assisting housing projects for lower income groups, and in mobilizing through self-help and cooperatives the human and economic resources of the country.

*A draft resolution by France and Greece (Doc. E/CN.5/L.214) was submitted this morning but withdrawn.

23. "This morning, comments in the general debate were made by the representatives of Byelorussia, Colombia, Egypt, Ecuador, the Dominican Republic, and representatives of the World Veterans Federation and the World Federation of Trade Unions.

24. "Anatoly E.Gurinovich (Byelorussia) declared that all governments should take responsibility for meeting the housing crisis. He described efforts made in Byelorussia through governmental financing, subsidies, loans, the free use of land the provision of building materials. Rents in his country averaged little more than 4 per cent of the average worker's earnings, he said.

25. "M.Y. Samy (Egypt) stated that his government was seriously concerned with slum clearance and had engaged in several pilot programs. He urged the UN Secretariat to explore further methods of self-help housing programs for rural areas.

26. "Luis Coloma (Ecuador) spoke of the 'bitter experience' in his country before the institution of a planned coordinated construction policy. At present, the role of the state was to support and guide private enterprise in this field. In many instances, he said, employers were compelled to build housing for their workers.

27. "Kemil Dipp Gomez (Dominican Republic) said that great progress was being made in his country's broad housing development. In his view, such programs should rely on domestic financing and resort to foreign capital only in very exceptional cases.

28. "Jacques Katel, representative of the World Veterans Federation, emphasized that profits derived from investments in housing could not be judged solely on the direct yield they might produce, since better housing tended to increase the productivity of the population and thereby the national income of the countries concerned.

29. "He noted that the Secretary-General had taken a similar view in recommending that external funds be used for 'housing projects which will directly increase national productivity.' However, said Mr. Katel, this principle should not be applied only to workers of an industrial plant. Adequate housing for agricultural workers would increase their productivity also, and thereby help to alleviate the food shortages which plagued a high percentage of the world's population. International lending institutions, such as the International Bank for Reconstruction and Development, he said, should take these factors into account.

30. "Miss Elinor Kahn, representative of the World Federation of Trade Unions, warned against certain dangers when housing was provided by large companies for their workers. It was essential, she said, that the workers be guaranteed independent rent contracts and a normal tenant-landlord relationship. In no case could such company housing become a substitute for government-sponsored low-income housing programs."

* * * * *

31. Further comments by Professor Tyrwhitt follow on the discussion of 10 May 1957.

32. The Byelorussia delegates pointed out the importance of housing especially in underdeveloped countries. We have heard, he said, that 60 million need homes, but this is an understatement. Over 150 million are living in bad housing conditions. Underdeveloped countries do not only include Latin America and parts of Asia, but other countries as well. Proposals worked out by the Secretariat offer some help, but there are defects. The proposals do not emphasize the role of governments. They state that ECAFE agreed that the governmental role was important for lower income groups, but we think the governments should undertake responsibility for housing for all income groups. We consider that only <u>state</u> funds can implement housing programs.

33. The representative from Colombia said that rural housing plans were less satisfactory than urban because they are beyond available funds. Low cost housing in Bogota has proved satisfactory. The problem of lower middle class has been the object of concentration by the Credit Institute of Colombia, and has helped this group to get good homes. The Inter American Housing Center deserves more recognition. It is now a sort of Pan-American university of housing. It has an interesting program in creating model houses. This project should be supported by the UN. The work of these two organizations has been most useful.

34. The Egyptian delegate commented on the movement from thickly populated areas to villages. To encourage rural building, his government has given "allowances" to assist self-help. Model housing projects in Khafir and elsewhere are being constructed for textile workers. 35% of the cost is paid by occupier as down payment. Mud brick houses were produced at less cost, with dome-shaped roofs. There was a successful pilot project east of the Delta.

35. The delegate from Ecuador stated that when housing precedes water supply, etc., bitter experience has proven that an overall plan is required. The rate of construction of low-cost houses is increasing in his country. Problems of housing can only be solved by cooperation between state and citizen, not by imposing a demogogic program. Middle class housing is being contemplated which will cost not more than 25% of income, and a new law has been introduced to encourage the construction of apartments for sale.

36. The Dominican Republic reported to the Secretariat its program: (a) to develop natural resources; (b) to extend long-term mortgage loans; (c) furnish public utilities; (d) to provide technical education; (e) lastly, to provide transport connections. Two model centers were built, one for workers, the other a middle-class project of more than 50,000 housing units. The country wants technical assistance.

37. World Veterans Federation reported that it wants redefinition of the role housing and community planning can play in economic development. One of the most important ingredients in social improvement is, of course, housing and community planning. The housing deficit is a serious obstacle to economic development. Housing cannot be judged as a direct yield. Even a small increase in productivity would justify considerable investment in housing. Adequate housing for agricultural workers would also help to increase their production.

38. The World Federation of Trade Unions welcomes the finance report. Stressed the importance of sorting out statistics. The establishment of industrial housing in rural areas does not affect urban housing problems but does upset rural statistics.

39. In regard to the resolution (draft) by France and Greece (Doc. E/CN.5L.214) the following observations were made:

40. Great Britain: wants resolution withdrawn. There is a better way of proceeding than by formal resolution. Doubts it is really necessary. Better to leave it to the rapporteur to record own views and leave it at that.

41. Philippines: Supports English delegate. Resolution not opportune. Sense of Commission already in the report.

42. Czechoslovakia: Resolution is an acceptable basis for discussion, but now that there is an appeal to withdraw it, would like to hear the authors. Argument in favor of it is that there is some value in presenting a brief conclusion to save people wading through report. Believes opening paragraphs should be redrafted.

43. India: It is not necessary to adopt resolutions on each item. Job of rapporteurs to reflect views of meeting. A few resolutions have more force than many. This one is good as far as it goes but what effect can it have?

44. USSR: The Social Commission should not adopt a multitude of resolutions, but we have two important reports to which we shall not return. There are recommendations in the second report and we think it would be irregular to stop here. There are certain points on which all are agreed. It would be a good thing to have a resolution.

45. India: Not true that we need a resolution in order to accept the report.

46. France: The only important thing is that we emphasize the main points of the reports. This could quite well be contained in a paragraph of the report.

47. Chairman: The rapporteur should convey all views of the meeting to the General Assembly.

Manitouwadge, a new Ontario mining community.
(Ontario planning supplement, 1957, vol. 4:2, with illus., maps, plans.)

APPENDIX

1. After the discovery of copper ore on the site, the Geco Mines Limited requested the Ontario government to develop a townsite which would meet both the immediate needs of Geco and the anticipated needs of the entire area. In 1954, the Community Planning Branch of the Department of Planning and Development was authorized to proceed with the necessary studies for the Manitouwadge Townsite, the pilot town in a new field of governmental planning responsibility. An area of 12 square miles was placed under the control of the Municipality to ensure control not only over the townsite and industrial activities but also over land which would be logically utilized by the Municipality. Administrative measures were taken to organize the subsequent operations in development, and a planner appointed to design and direct the plan of what was intended as a model community.

2. By the end of 1955 utilities were installed, buildings were put up, including a school, skating rink, 50 houses, a hotel, and a few commercial and industrial structures in what was designated as Neighbourhood no. 1. Number 2 was well built up during 1956 with houses, commercial buildings, community facilities, a beach and dock facilities. Plans are made for continued building activity in 1956 and private enterprises have already contracted for a theatre and other buildings.

3. The program for development was based on studies of the population and its characteristics, generated by the mining and pulp industries, together with allowances for growth, land and building requirements. Ground surveys had to be made to ascertain its limitations and influence on the layout of the site, and to prepare a land use plan. Unlike mining towns of the past that just grew with the multiplication of shacks, Manitouwadge was given an organized plan with an integrated pattern of five different land uses: residential, commercial, service industrial, open space, and rural. Each residential sectors was then given its own center comprised of a neighborhood shopping center, school, and church sites. The residential system was grouped in general about the central commercial center, the heart of the town. A basic road pattern was designed to link the different sectors of the town, to extend to the two mines, and to the regional area.

4. The residential sectors were planned to include as much natural beauty as possibly by utilizing the contours of the land in laying out the streets, and by saving trees where possible. Zoning has made it obligatory to vary the external design and color of houses, and to build them in conformity to a set staggered system of setbacks from street lot lines. House type was varied and multiple family lots were provided in each or the three residential areas to permit the development of apartments and group dwelling (parking required) to assure a variety of dwelling types in the community.

5. One of the first requisites of planning the town center was to separate pedestrians from automobiles. Automobiles were permitted to reach the town center, by-pass it, drive around it on a loop road, or enter into it to park or circulate to a limited extent for pickup or delivery, but other than this, all space surrounded by the loop road was kept free of the automobile and for the exclusive use of the pedestrian.

6. Open areas were provided in the design of the town center for public gatherings, the formal town hall garden square, the semi-formal pedestrian ways, and the informal parking areas and community center grounds. Provision has been made for future protection of streets from snow and rain. Landscaping was considered an important part of the plan. To screen the area from the noise and fumes of motors, the parking areas were designed to be surrounded with boulevards of grass, trees, and shrubs, the pedestrian ways were provided with planting areas.

APPENDIX

7. Commercial properties were given economical modular widths and depths to permit the purchase of suitable sized properties by either small or large business concerns. Zoning controls the heights and sizes of buildings, the sizes and locations of their signs, and the use of fences or hedges. Thus, harmony was ensured in the overall architectural framework, while individual choice was permitted that would not conflict with the general appearance of the town center.